DOCTOR OF PHILOSOPHY

Visualise: an exploration of an artist's approach to 3-D computer visualisation in clinical radiology

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University of Dundee

Transcript Data

1. Pilot Study Transcript Data

1.1. Fine Artist Z

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Duration: 00:39:33

J *So this is the second half of the experiment, so the first half you have obviously been exposed to some of the images and there moving into the second half and I've just entitled this 'dialogue of conversation' so this is the open ended, there is not really much of a structure to this and it can go on as long as you would like it to go on or as little as we want. The first, as I maybe explained to you in the first section I wanted to cover three key areas with the injury that you have looked at, the first one was the logical often termed as naturalistic perception but what did you regard as the physical part to some of the pieces, maybe if you want to talk about this first area of how you physically navigated round some of the images and then from that we can move into the more emotional aspects of the pictures and then finally we move on to the overall aesthetics, how you felt it all fitted together, maybe you could start?*

FAZ *I started there as I made a decision, I didn't go backwards but it is interesting to see that is backwards because I had no knowledge whether you did if from left to right or right to left. I only managed to see four of the images closely, em when you said about logical and naturalistic perception, what I did was described them as unemotively as possible but at the same time I found them incredibly, not incredibly, found it difficult to not think about them emotionally without some sort of aesthetic judgement going on, so that the last one, the kidney which I've seen before, so I don't know if I had known that was a kidney if I hadn't know of you, so put at the top logical emotion in total and kidneys, if I try and describe it logically I think it looks like a deformed brain, my initial perception of this, whenever I look at it and I've seen it quite often I have to remind myself that it is a kidney and not a brain which interests me because I have no idea why I think it is a brain, it glistens and so, right I'll stick to the description, it glistens and I can see.*

J *You don't have to, if you want to link the two together*

FAZ *Well I'm trying to break it down because I think that is helpful because then I get to the total, so it glistens so it is shiny and that makes me think of things like slime and internal mucus and stuff like that, you can see these internal structures within it, then that immediately starts*

questions, because all these thoughts happen at the same time, is what are the internal structures now, in my rudimentary knowledge of kidneys that I know that there are internal structures within them and I can't remember what they are called but it has got some sort of weird geological name or.

J *I think it is profusions.*

FAZ *Something like that yeh, it is just dead strange names and I've always been interested by them and then I looked at it again and I thought that is when the emotion really kicked in, they look like people inside there, all sort of lined up in some sort of weird panorama and then the logical bit kicked in and said, this is a strange image because the kidney never always sees the light, it is enclosed in darkness and although you have it enclosed it in darkness, it is not the darkness that it would be if it would be within the body, you would not be able to separate the kidney in that darkness from anything else, you would have to feel the kidney to be able to find it and I think that it is beautiful, a really beautiful image.*

J *How would you describe beauty then, what would be your parameters to describe that really?*

FAZ *In any image or just that one structure?*

J *Yeh*

FAZ *For me it is a sensation thing, it is an intermingling of visual and sensual, not sensual as in sexual but sensual as in the body's perception of what it is that is before it or what it is that is within, so I consider beauty to be when a state of balance is reached, where you can look at something with no consciousness of time or even necessarily what it is but just look at it and understand that is it beautiful and I don't know if that makes sense?*

J *Makes perfect sense.*

FAZ *I think that the total thing, I think and this is where the internet kicks in, it is unrepresented of its true nature of being a kidney, it raises, the image raises more questions in my mind than it answers as I don't know what it is for and just as a kidney does not function by itself, if that was in an art gallery, it would function by itself but if it was out with an art gallery it wouldn't would it, it would be like kidney, just die, but you see that one is prejudiced as I have seen that before. The next one I haven't seen before and I had to draw it because I had no idea what, no idea what it is, but when I didn't have any idea what it is I thought that is actually more interesting so again I divided it up and I put its and then I thought there is no point writing it because I will write it within the drawings, it is white and grey, it has got a shadowy internal chamber, it has got a bone in protrusion and it makes me feel sick, so*

then that one is dead strange because that one, I think it is very beautiful actually but it makes me feel sick which completely contradicts what I have just said, which means there is a difference between objectively understanding that something is beautiful and my subjective experience to it so I can intellectually understand that it is beautiful but subjectively think that it is not, so my definition of beauty is still the first one but I understand when something is beautiful that I don't perceive as that makes my feet feel funny, in the same way as good art, well really it is good art, it is good art because it would function in an art gallery, people would look at it and think what is that it is beautiful but all I can think it knowing you again, so this is going to be interesting because you are going to come up against people who don't know you work, I think that is a bodily process, now I might be completely wrong, it might not be a bodily process at all it might be something you found on a beach, but I've moved on to is it an internal, so the question is raised, is it an internal structure of the ear is what I thought it was an aesthetic ear wax from aesthetic ear wax do I need to know what it is and then I've got a question for you, the light is from the direction as on the kidney is that random or do you always put the light from the top left?

J *Em, it wasn't random, I had positioned the lights for the best aesthetic impact, there is only one light on that one compared to the other kidney which has two lights, so it is a different process, a different technique to develop it but it is actually the kidney, it is the same kidney*

FAZ *Is it*

J *It is the same thing it is just using a whole different technique*

FAZ *Ah, so it is wow, so why have you made it, oh no I'm not allowed to ask you questions.*

J *No go on*

FAZ *Why have you made it white*

J *Because I wanted to make it look like it was like lifeless and went to the body worlds exhibition and they way they, this tuff looked as it is drained of blood everything goes that kind of peelly walley colour and that is what I wanted to because if you did remove those objects from the body they wouldn't function they wouldn't be red they wouldn't be like that they would be dead because they can only live in context.*

FAZ *They would go white?*

J *They would just turn into this kind of dead tissue colour because it is blood that makes them red.*

FAZ That is such a surprise, I really, I know it is a kidney now you have told me but I just thought it was just bones.

J That is interesting that

FAZ Don't tell anyone as they would be interested to find out if everyone else, now you have shown me, now you have told me

J So much more subtle lighting as well, the light is absorbed into the surface rather than reflected, so it is more like real tissue, like real skin, well obviously not skin but the light is diffused on the surface rather than reflects straight back so you get this much softer shadow and a much softer process, it is a totally different media.

FAZ Yeh, those are really nice, next one, that one I don't know what to think when I was looking at it because I can see from knowing you that it is an internal structure but that is only because I know you and so I described it as white lines with red contents, emotion, none, except sort of query but that is not really an emotion is it, and I don't know, it is a 2D image isn't it so overtly it is a 2D image until you look at the contents that is in it and then you can ascribe 3D to that but my totally response to it was that if I saw it without knowing you I would think it was either the internal structure of a tree or a satellite depiction of a geographical area, eg a river flow, where they were putting some sort of fishery migration because of animals etc, so inverted commas I've put I really see this one as being a scientific image but then what do I mean by a scientific image because it is not one of those, well the other thing that I thought when I looked at it was it was like a thing a psychologist would give someone so not a raw blob but something where they say to you 'what is this' and then my child eye starts making sort of animated shapes, that one I really didn't know what to think to be honest, the next one I knew it was the kidneys (laughs) of course you are going to tell me it isn't now and that is when you came in so I had only just started and the one on the right I was looking at sort of thinking it looks likes broccoli, it looks like a strange head of broccoli

J The one

FAZ The one on the right at the bottom, I've drawn it there so you know which one I mean, but it is really interesting, I'm interested that I only got round four images in ten minutes, you will have to see if that is an average and then decide what you want, I didn't get across to this side at all.

J I think maybe a longer process, it is part of em, I mean I don't know you want to continue on with this, what I would like to do is the sort of second part of the experiment as obviously we didn't get to any of these ones here, the other option is that I can leave you to look at these or alternatively we could, what I wanted to do is use the post it

notes to try and look at it, prioritising the scaling sort of 1 – 5 although you have got through four images which you felt were firstly the most logical images and then which were the most emotional, so obviously one being most emotional and 5 least emotional, one being the most intuitive or the most logical in imparting information and 5 being the least more ambiguous to offer information, so I don't know, or do you want me to leave me to look at the rest of the pictures?

FAZ *What time is it?*

J *I don't have a watch on actually.*

FAZ *I've got my phone, as I have to leave at quarter past ten as I have an appointment that I keep breaking and I can come back and do it again, I've got fifteen minutes.*

J *Okay lets do the grading*

FAZ *So it is each one of these boards, like you said emotion*

J *Emotional, logical so there is just two, I thought the third one could be the total, if you want to prioritise which work is aesthetically in its totality of all those things combined.*

FAZ *So I put one as the most*

J *Do you want the marker, it might be easier with the marker?*

FAZ *You can't use these on different people.*

J *No*

FAZ *I could come back and do it again if you like but that might defeat the point.*

J *No I think we will just have one go, I mean we can do more of these and I would like to do more*

FAZ *Well if you have got a time factor involved, as this will take you a while to write this up.*

J *I think probably do one more in the summer, later on in the summer*

FAZ *So this is a sort of test isn't for you?*

J *Yeh*

FAZ *You should make a ????*

J *Of what, in reality, well I've actually got one but it is 75% scale and*

FAZ *Next time, you should, like rapid prototypes and give them to people to touch, so this is the culmination. Take them down now.*

J *No, leave them I won't be seeing someone till after lunch so*

FAZ *Is that out of Gray's Anatomy?*

J *Yeh. In terms of the emotionally did you feel that the one you have prioritised as number one is the most emotive which is that one, do you think that is of benefit to people who are sick or do you think that would only function on an artistic context?*

FAZ *My personal opinion is that it functions as a work of art, I actually think that my personal opinion is that I don't think it would inform the patient.*

J *And the one you have put as number one in the more logical, do you feel is that because it show you the underlying structure of the kidney?*

FAZ *I think because it shows an underlying structure and it would make it easier for a clinician of some sort to explain to someone what was going on within their body and a more efficient way the Gray's thing*

J *And what do you think about the Gray's thing?*

FAZ *I think it is very important but it is a slight, no something that you can see that everything is going to be moving whereas something like that for some reason it makes it feel like it is pumping rather than circulating and I know that they are almost the same but it is like a backwards and forwards thing, and that looks like a mad bit of broccoli as well, with a bit of cauliflower on top.*

J *That is the one in the middle*

FAZ *That one.*

J *Yeh*

FAZ *But did I say broccoli, that is a sliced cauliflower*

J *From the Gray's Anatomy?*

FAZ *Yes*

J *Do you like broccoli*

FAZ *Yeh (laughs)*

J *Well what is you thoughts on the gray one?*

FAZ *Well I didn't even know what that was, I knew it works as a, it paints a really creepy image*

J *A what sorry?*

FAZ *I think it is a really creepy image as I can't work out what it is of and the only reason I know it will be kidneys is because of you but if I didn't know what it was, it would look like some sort of animal lurching out of the gloom a nightmare gloom imagination. What is that one?*

J *Yeh you have a full look at these ones actually em that is kidneys again that is from a scan, that is how the machines make 3D on the computers at the hospital.*

FAZ *That one*

J *Aha, and that is not a very well person, now what do you think about that in terms of*

FAZ *It doesn't look well but I don't know whether that is, I mean have you chosen that colouration, who chooses that colouration?*

J *It is just a diagnostic colouration*

FAZ *So it has absolutely nothing to do, see I would have said even before you said that that it wasn't a well person, I would have looked at that and thought that doesn't look well but I don't know if that is due to nothing more than the colours because I wouldn't have known, just shows you how much goes on information that people tell you along with the image.*

J *I know, I know and in terms of comparisons to these other images would you say that one is emotional, it has an emotional content?*

FAZ *Yeh but that one does as well and that is the actual insides of the body isn't it*

J *Yeh that is a photograph of the kidney within its context, if you were to cut me open that is what you would see, and what do you think about that image?*

FAZ *It is totally unreal with twists and turns, I mean the thing that works for me is the actual mechanics and looking to find that thing, I not disgusted by it or anything it is just like wow, how do you know where to look, I mean everyone has vaguely go them in the, but all sorts of thing start going through my head like the history of cutting people up to see what is inside and then when did they establish they were always finding the same bits, that the same bits always occurred in the same place.*

J *Do you think that has got an emotional content or a logical content or both?*

FAZ *Both, it is both because there is a sense of wonder that gives the human experience of doing that, doing that sort of exploration thing themselves and there is a sense of wonder at the human body's beauty as a functioning organism and that it can keep functioning despite being abused over a long period of time by most of its users, and this is ??, is that a kidney?*

J *Yeh*

FAZ *That looks, the first initial thing is that it is like a sci fi thing which is like those, like the movies and then I think that then they are a really good, I think for patients they are far more helpful than something like the gray's or is that an x-ray or what, an ultrasound.*

J *That is a MRI, that is a scan, that is a MRI scan of the, all these images are taken from that one MRI scan, they are all from the same thing*

FAZ *Are they?*

J *Bar that one there, which is from a slightly different one but all the images regenerated are from one source. Do you think that the sci fi style or the ones that look are they less emotive or more emotive or do you think*

FAZ *It makes them a more efficient exchange of information but I don't know, I can't be certain if it is tied to emotion or not, really because I think it is very difficult of me to untangle an emotional response from a more logical one as for me apart from that one where I didn't really feel any emotion about it at all*

J *That is the 2D*

FAZ *The top one, the 2D one, but anything that has got pointers, clues towards 3D and to movement and to internal processes I can't disentangle anything, emotional baggage.*

J *And one we haven't really talked about is the*

FAZ *Red blob*

J *Yeh*

FAZ *I relate it to broccoli and I can't get over how you get the, what I find interesting and I mean I haven't examined in as much detail as you have but in my work I have looked at various things within the human body and what interest me is how you get the same things occurring in different parts of the body, so if you take an image like that, if you can*

take parts of that image and you could have an image from parts of the brain and it would be almost exactly the same or thinking about things bones there is the a bone in the pelvis which is shaped like a bone in the base of your skull, they are almost identical in their shape and I find things like that really interest me and I find an interest in that I always like to mix things like broccoli and trees.

J *Do you think that one is an emotional*

FAZ *No, none at all, it is similar to that one, but I find it more informative that that one, but at the same time whenever I looked at it I would have to have an explanation from someone, I mean if it was my kidney I would still need an explanation of what was wrong and what was going on, I couldn't make sense of it by myself.*

J *I suppose we are getting there, the sort of clinical applications for any of this, I mean how do you think that functions in terms of something that is purely an aesthetic piece and not*

FAZ *I like it, I don't for aesthetics, that is the sort of Paul McCarthy type image when he takes his fine art, and he trembles on the line disgust and nausea, this is like a sort ??? album cover it is like, that looks like a botanical drawing but it doesn't function as an art object, this one has a cross over with that one, it feels sick, I don't know if that is, maybe it is genuinely established that Gray's Anatomy are finer illustration, they have some detail, that one is like ?? album cover as well but also that one reminds me close up of a tic or a flea I mean which bit is this, is this the bit where it goes into the kidney and comes out, this is the kidney*

J *No that is the aorta that is the tube that feeds the kidneys*

FAZ *This is where it is going in?*

J *Yeh exactly.*

FAZ *So that one functions as an art work, I wonder if it set, speculation does as image only make sense to me if I can put it in a context, so if this one, this actually doesn't really make official sense to me at all so no, I like it when it is a vision thing, no I can't do that, I can't say that because I don't think it is what I'm thinking, I can say that I think maybe, and I will have to think about it further is how often do I consider that something is beautiful when I can make sense of it in relation to something else, am I more likely to think it is beautiful if I can make sense of it in relation to something else, correspondingly am I less likely to find it beautiful if I have nothing, no markers to make it make sense so to see, so going back to these two, even though I don't know what that is, or didn't know what that was there is an internal history and experience of perception of these that I could place that*

against other things in my perception of the world and it made more sense than that, get my meaning?

J *Yeh*

FAZ *Whereas that one couldn't really make sense of it at all, I mean I theorise about what it was but*

J *Interesting in context and logical are inherently linked to emotion and they feed off it*

FAZ *Yeh and they are built up over time as well, you can't take away the time element, a persons experience over time*

J *Don't you think if you look at all the images collectively which one would you say has that kind of totality, that sort of relationship between logic and emotion and feed off one another to produce a harmony, would you say you still stick to your priority*

FAZ *Well logically it is that one, because that is the only one that gets you enthused, yeh it would be that one.*

J *Good, thank you Aileen*

FAZ *It say blood flow there does that mean end of the session?*

J *Well I mean*

FAZ *If you have any further questions just email them*

J *The interesting thing is that you have obviously just ignored that and maybe that is just the way the point to see just how much people can take and how much I can extract.*

FAZ *I wouldn't say I ignored it, I didn't get time.*

J *I think to navigate all these complex issues and that as well is probably just too much.*

FAZ *It might not be, it might mean that as you know I am very slow, now you might find that XX would come and sit in her and just whips round and he might not, so I think in this study stick to the 10 minutes and just register that some people take longer.*

J *I think I will make it 20 I think I'm going to double it because I think realistically it is difficult to get around the images, I mean you barely got through half of them and even if you are slow*

FAZ *I am slow*

J *But you were thorough in the way you were navigating through them you were doing exactly what I want people to do in that case, and if that is the case then I think I'll probably give people a bit longer, I think what I will do is make it a bit more open ended so that the next person when they come in I'll ask them do you need more time.*

FAZ *What you could do is get them to put one of those on the door when they are finished*

J *A post it*

FAZ *But then they might take ages, the only thing, so there is a time thing about that, the other thing is that they might get image blind by the time they get around there or vice versa and you might not be getting so positive responses in the second half because remember that peoples concentration, don't do more than 20 minutes because 20 minutes is peoples concentration max.*

J *Maybe I should just keep it 10 again and keep it consistent because then if you start changing it for each person*

FAZ *Well have a think about it after I've gone and think about, I would say not longer than 20 minutes as people will get overflown.*

J *Because you have been talking for 39 minutes, so that is about right it is about an hour per person, so you are bang on time, I'm going to stop the tape.*

1.2. Designer Y

Date: 28/03/08
Duration: 00:49:24

DY The first thing I did with this was when I first saw them as a collection of images, my head immediately wants to work out how they were produced and that might just be because I'm a designer and maker myself but there was a curiosity about how were the images created. So the first image possible, which had most of the stickies on it I thought it was probably a photograph. It had, you know there was a wetness, there was a sense of blood, there was a graduation of colour, shapes and tones, that was really apparent. And, if it is a photograph, and you might correct me, but if it is a photograph, it kind of suggested to me a real person…

J It is a photograph.

DY …and who are they, you know I immediately wanted to know was this person still alive. Were they young, were they old, were they male, were they female. Is this a photograph of illness or disease or a picture of health? You know it raised all kinds of questions but at the same time as was like much because there is something about the quality of the colour of the blood. It suggests these are things that are normally hidden to the eye, we're not used to seeing these kind of images every day and you know there may well be a very good reason for that, that we're not meant to cut people open routinely. So yes there was a sense of movement. There was a sense of the blood clearly flowing. I didn't get the sense that it was a dead piece of meat or flesh but it had an immediate effect, a strong emotion content. It really kind of shook me up in lots of ways and…Then I looked on to the image that was directly to the right of it which was in such stark contrast because it felt quite abstract, quite removed. The quality of the colour you know it was pretty much two-toned maybe three. There wasn't'

J So did you feel it had like less of an emotional content?

DY Oh yes, a lot, lot less. Yes I didn't have the same kind of curiosity. You know I wasn't even that bothered I must admit about what it was telling me or what it was showing me. I couldn't' work out whether it was a brain or a kidney. The one beneath it I thought was interesting. It immediately kind of said potatoes to me, roots and seedlings of potatoes. I wasn't again quite sure what it was because it was hazy and blurry and again it was a bit of work. Colour or the shades of the colour, I thought it might have been an older technology not quite x-ray because its got colour but some kind of scan.

J Yes I mean just to give you a bit of background to that image, that's actually taken from a state of the art, quarter of a million workstation that does 3-D reconstruction on an MR.

DY And what is that?

J That's a kidney. That's two kidneys and an aorta. But it's purely driven by diagnosis that's just like number crunching.

DY Whereas the other image, just on that same sheet underneath the photographer, computer generated, it has a sharpness, a clarity of definition and not so much by tonal, by variation and, in particular, amongst the blood cells and one of the issues that I raised or stuck up on the sheet to your moving image was I know that in biological life and in our own life colour plays such an important role. The importance of reading colour. I think colour has a very meaningful nature and what you tend to find…like I've heard colleagues, jewellers…a colleague Sue Barne who lives in Edinburgh, she was brought up on a farm and she talked about how her father would take her around the farm and you could tell by the colour of the corn when it was ready to harvest and similarly I think in the health of our own body, so I was curious as to whether the colour of the blood cells would change when they pulsed as they moved through the system. You know if there was a discernable tonal difference, noticeable but also what kind of colour variation would you see in those blood cells. You can read I think a hell of a lot from colour particularly when it's comes to health and wellbeing. Moving on, this 2-D life drawing I was fascinated by it. I thought it had a lot of traditional associations, a sort of Victorian, turn of the century, text book image and I was curious as to whether just how representational or how interpretational it was because my knowledge of these kind of characters is that they tended not to represent accurately either relationships in terms of distances or functions but I think in many represents adopted a much more holistic approach where they really tried to catch the essence of something it was a much more artistic intuitive approach to visual representation but I think you know that style of pen and ink you know we've maybe have moved away from that, its relevance, you know we maybe have greater expectations for colour and movement but I think there is an element of the process that they adopted that we are in danger of losing, but it had a logic and you know even the style of the writing I think had a certain emotional content.

J It's a really fascinating area because it's all…you know they looked at it and they produced these images in much the way a scientist would produce something off the scanner and I would stop and see an objective truth way but in actual fact it couldn't have been further from the truth because a lot of it was interpretative.

DY I think issue of truth is a fascinating one because in my business I have to distinguish how can I put it - a scientific truth and a poetic truth and I think particularly because of mechanistic size or reduction in size we

*tend to see truth as something fixed and definite an out there. That's meant to be discovered. Finding where really I think truth for most people is what we create within ourselves and particularly when your in the business of health and wellbeing. I think…appreciation is a more *poetic form of the truth*.*

J Its funny because that's from Gray's anatomy a lot of that was influenced by a lot of the engineering drawing styles of the time and in nautical and mapping it's almost like they charted it out in a similar way, tried to graft that into that medical…but it implements text as well which is quite interesting.

*DY It is, that's a good point. I hadn't picked up on that. People do ***** but some of these words I mean hilum means nothing to me. I think when you think of the intended audience, it was predominantly the specialist, the surgeon, the medical student. They needed to be told about the labels. It's not a language that use would use in with a patient.*

J It is still used today though Gray's Anatomy, funnily enough medical books, anatomy training its still one of the main stays you can still buy it in any medical school shop, which is fascinating to me.

*DY I remember a *jeweller*, a colleague had borrowed a flatmates Gray's Anatomy for a project and somebody nicked it. She was furious but it was just that somebody would see this as such an important book but that they wanted.*

J Martin Kemp calls it non-style. He calls this kind of like he has an argument that there is a non-style to that particular illustration but it isn't true because it's…

DY I think what's different is that this is based on such close detailed observation which is really important and that's where the emotional impact come in I think because it is about relationships and about developing a better understanding through the relationship. It's not…why the artistic approach was so important is because of that emotional content. It wasn't the detached objective observer, it was a subject with an emotional observer because in some cases yeah I mean…

J You couldn't separate the observer from the observed which is part of our ideal isn't it.

DY Yes well I feel it is. I feel that that's what we as artist and designers bring to it and particularly the context that your looking at, communication with patients and a lay audience. Because one of the things I've said..is yes this bit here in this image, is this kidneys again.

J Yes it's the same thing.

DY Its quite depersonalised. I mean the image is very sharp but how important is the person in that process and if this is part of someone's process or treatment or moving towards well being and moving towards better health and how important is the process of personalising something and how import is the process of visualisation as part of that approach because I think the person…it's really important in health and wellbeing to make that personal and immediate connection because it's about encouraging people to relate to a part of themselves in a positive way.

J Do you think just rewinding slightly Sandra these two images here out of Gray's anatomy.

DY This one I got excited about again because I felt this was an x-ray probably and because of that I had some of kind of authenticity that it has to be a real person again and I think those visual associations, those reference points are important to how we relate to the image because a point I picked up on with this one over here is is the form of visualisation is recognised as a game in technology what are the indications of that? Life again…What's real, what's not real? So its all of the associations that go along with that particular process and the authenticity or the integrity I think integrity is a better word. What percentage of people have associated technology and how having to be where it is today.

DY Although I do think it is initially…when people see that kind of technology, there used to seeing that in a DOOM or whatever else it is…you know some of the more violent games or I'm trying to think of game I've banned my son from playing - Grant Theft Auto or whatever the hell. If those are perceived as amusement, trivial fun then how much harder I think do you have to work. It doesn't come with the same sorts of associations as this kind of image but for me you know an authenticity, an integrity of its own. You can over come them.

*DY There were issues. But yes I thought this image was really interesting because the whole business of the light here. What was the significance of the light? What was the light? I mean I started asking myself questions like are the blood vessels moving and if so are they away from the light towards the light. Colour issue again. The size, how important is size, is there a prospective issue here or was size *communication*. Which is why I thought moving on to the digital piece, because I saw the features seemed to be moving toward the light.*

DY This one is obviously interesting and useful it's just like a circle as a visual means of drawing attention to you know that circle gives so much meaning to an image because your clearly trying to demonstrate the narrowing of arteries. I mean the eyes are immediately drawn to that. This one made me think as well…is it bone…

J No it's actually…it's interesting there all taken from one set so that's a kidney as well.

DY The quality of the you know…That was the one that I'm quite fond of that I wanted to touch and I think because of the kind of luminosity the sort of shininess of what I thought was bone but it made me ask the question. If it had been bone and I wanted to see it as a 3-D physical body because I think in the emotional content there's another issue that touches you. Fraser and I came across this web page in Milwaukee which was really funny because it talked about the SNP test which is the sticky finger print test. I think I told you that. If you use a 3-D physical model and switch on your computer screen and if its covered sticky finger. You're hands are reaching in. This one like I said I really wanted to touch it to kind of stroke the quality of the smoothness, of the texture because there's a lot of textured detail here. You know sharpness of what I thought was the end of bone or cavities your hands and fingers want to explore but that one I really wanted to reach out and touch it. You know as I say as a physical body that was just great.

DY The moving one I thought was really interesting because you got so much more information about things like direction. You got more of a sense of pattern and order but then I couldn't really read anything in the pattern and I think a lot of what we take from visual images is to do with our mind make sense out of the pattern and creating order and again though there was no shade not so much tonal quality in the read blood cells and like I say I was curious as to whether the colour deepened. Again I couldn't feel any personal connection to this but it could have been cow blood it could have an alien but a green wall and the red blood cells, are we green inside. But again I wasn't sure where to connect but this one did communicate a lot more with you could engage more I think.

J Fatty deposits in the arteries.

J Okay Sandra you've covered quite a lot. That one in the middle you haven't put anything on that one. Do you think it is very ambiguous so it's difficult to interpret.

DY I guess it is. I think it's the amount of blackness around it. It's looking at something in isolation. I think for me out of all of them that has maybe taken most of a reduction of medical approach I think. Just because it's so isolated. It's one thing and then you don't' know what else is going on here. It hasn't got any relationship to anything else. All the blood vessels you look at looking at aside angle rather than above or below. There is some sense of movement you know widening to a narrowing and but that image a sense of similar things.

J Have you looked at the kidney.

J *That one is tended to be about. What I'm trying to do with that one….it's interesting the kidney when it loses all the tissues dies and the blood drains out of it, it isn't red anymore. Its *body world exhibition* had lots of kind of like preserved plasticised body parts and they all have this kind of bland beige feel to them but they have this kind of like…they absorb the light a bit like skin and that's what I tried to do with that. That's why because there much more subtle blending across it because its absorbing the light up different ways. It's the body using computer graphics for skin so that the light hits it and it hits another layer and another layer so you get this kind of diffusing effect on the top which is not so sharp which is what a lot of these are kind of like 3-D CD stuff looks like the light hits it and like straight back it's like a plasticy feel. Good.*

DY *There is some emotional content and I think the use of the light and the shades of red, well there's more…it's a sense of something.*

J *It's transparent though so you can see right through the structure.*

DY *I think on that image I'm just again unsure a bit what the message is or what it purpose is. Things like this one maybe because of the historical appreciation or knowledge but you know this is about explaining something you know it's just attaching names to things and it clearly has a very well defined medical purpose. Whereas with some of the other images I am a bit less sure of maybe it's because of the association about where the technology comes from and because what little I know of what you've told me about your projects as well to the extent of which some of these images might play a role not just in helping the individual understand better what's going on with them but actually be a tool or a aid for aiding their recovery or getting toward a position of health.*

J *I suppose it's a bit of all those things but at the moment it's more of trying to scope out the role the images play in well being and health because they play a huge role yet there seems to be very little in terms of…*

DY *Documented or recorded*

J *Yes exactly, particularly because a lot of medical imaging and the newer stuff is in its infancy. Very kind of deep scan, your normal x-rays are part of our cultural psyche almost but…*

DY *I mean it cancer treatments. I worked with a colleague in Glasgow in health promotion who…she firmly believed in the place of visualisation in you know complementing other medical treatments in the treatment of cancer so that patient could visualise cell development and a healthy plan development. If they could with their mind blank picture that and but actually found it played an important to health. So you could see*

how an image like this one, a visual image you know it just gives people something to focus on. Work with, could be quite important.

J *Okay the other thing as part of this experiment which has been useful because you've given me loads of information, I thought it would be useful to try and like on a scale of 1-5 prioritise the images that you feel are most logical and most sort of like give you most of the incense of the kind of structural and physical attributes of the anatomical structures, obviously 1 being the most and 5 being the least and then the other one is emotion use the post-its to the same.*

DY *Structure and emotion 1-5, 1 high structural content, 5 least the least.*

J *And then do the emotional after that. So you think that one gives you the least.*

DY *You and Louise are the only people from design school. it's Will McLean, Aileen and Murdo, Ewen McArthur and I think Louise Scullion might come along as well. It's trying to move away from the people that might get some insight through the technology class bits of the imagery because I think what you've described is important. We want to know how they were made and I think people that come from the animation department and computers…would try and disassemble them rather than look at the emotional content which is what I would do, I would try and disassemble them all*

DY *But the extent that you can separate how they were made from the emotional content because I think the two things are really closely related. Because like I say with this one I mean we know that it's been made by hand. We know and when something is made by hand, speaking as a crafts person and as a jeweller, when something is made by hand and it takes a long time to produce, there is luck, there's care, there's attenuation, there's dwelling and there is relationship.*

DY *The click, click, click of a mouse button and I'm not undermining you in any way but it is what your doing in computer imaging but there is a degree, there's a coldness, there is a distance that doesn't exist on this one.*

I suppose that you're right extremes of the two, I think once you get into the…

I think what's really interesting about the trends and movements in the computer industry is I have a colleague that I work with in many respects there work is as much about bringing a greater degree of humanity to the technology so the extent of which you can touch things, you know computer interfaces that you can run a pen across a sense of wetness quality of silver or rubber or different textures so things like emotion sensors that we use in the evoke in the exhibitions is about the pulse of heart beat and profound and you know touching all of the senses and

not just the visual because for me a realistic experience is about something that I think all of the person, smell, touch you know I think there is an over-dependence of the occular vision and I think we fail to or we forget that vision is a whole body of experiences not just the use of the eye. It's a use of the mind, touch, smell, temperature, reading a colour you know vision is a whole body experience. Vision is a whole body experience I'm getting on my high horse again.

A lot of structure in that one.

*What I didn't get from that one either is a sense of scale. Scale is an important quality for somebody to ******* you part of the body ****** ***** indication ****** ******* structure. Emotion content.*

J *Do you think emotional content and ambiguity are linked?*

DY *The more ambiguity the more emotional the content, sometimes. It's a very Japanese eastern way of looking at things but in contrast to the west there work . I have a good masters dissertation from a jewler at the royal college. Again that was very ambiguous I had no idea what it was whether a brain, a duct you know but nonetheless **** the shade of colour, the…*

J *Can you see the kidney? Can you see the staple?*

DY *Oh my god.*

J *See just down from where you pointed to.*

DY *Yes these images are so sharp. There's not the same kind of ambiguity associated with them. graduation colour, scale you know the features are rather *****. Shading lightness and darkness. blackness. There is a lot of content in this one though. Broadly the same kind of size. There is shade, there is likeness.*

J *Beauty in that one as well.*

DY Yes.

J *I think it's important what you said this whole point of clarity because clarity and crispness doesn't necessarily mean instantly information of pattern. The actual clarity can actually obscure information exchange because you describe of that one has been so sharp and crisp and so it lowers it's emotional level magnificently. It increases it's information pattern but because it's so crisp it doesn't look natural so which kind of lowers its emotional level. Whereas that one in the corner that you describe is hazy, it's absorbed, it's diffuse. It may have some sort of animal feel to it. It's interesting about this link to the maker* as well I liked that.*

DY That's crusial

J Because machines make…millions of images…well that's not true, obviously that one there and… that's from an MRI scan that one there. Those kidneys are what all these images are made from so neither of these have been crafted anyway they are pure automated process. Although you could argue that the radiographers are a craft because they spend years getting to the point where they can take these pictures like photographers.

DY But this first come out of a conversation I had with Professor Angus Lamond at the Welcome Trust, this is a difference between representation and interpretation because the radiographers spend years developing this technology. I think what a lot of people you know the average punter in the street looks at an image and thinks that the visual image, especially with something like MRI scans or whatever, have a greater degree of truth or authenticity to them because they are a photographic representation. So they believe that that's what would be you know if you cut it opened and looks at it. But what I did was very clear in saying to me these technology they are still ultimately interpretation. The same way that that line drawing is an interpretation but one might be more reduction so the other might be more holistic. The protein molecules that I was looking at or working with we had the same information, the same data but five different representations. Now those five visual images of the same information were all very different in terms of their aesthetics, in terms of colour and in terms of the information that they communication. Some of them were representing and just putting molecules and atoms, others were temperature, others were you know it was like an overly of 5 different maps. You think of the maps of the worlds. Mary McLey (British philosper). But its all ultimately, you would think that these are true representations when really they are still interpretations, human interpretations or they seek to communicate a particular piece of information. The difference is relevant between meaning and information. Information could be quite meaningless. Meaning is a more powerful…

J I think you know like its emotion as well. You can increase the order magnatute of complexity because the reductions perspectives don't really build into the view of the world because they don't have the tools to do so.

DY But it's not to say that reduction is all wrong holism encompasses a degree of reduction mechanization there is a place for looking at things in parts detail but as law, a still holistic overview.

J It's a bit like, I suppose a blended approach to everything. I mean people always think medicine I think have come across like this is going to be not just in context to other things sorting all these problems I mean it doesn't exist it's a multiple of multi-fasted approaches to try and deal

with different parts of the problem rather than one over arching like architecture.

DY *But often as well I think, even if it is was like if I was a surgeon and I had been operating on your kidneys or something and you'd come into see me and I'm going right well I don't have any of your visual imagery here but I'm going to draw you this sketch or whatever and the patient takes that away. That can be such an incredibly powerful thing because this is somebody that's been inside me but has touched part of my body and has used his skill and expertise and you know I would be curious as to how the clinicians sketch these things out visual diagram of information that they produce so if I was you I would be rifling through there things and you know going for their ink blotters on their desks or whatever but I probably carry many of the informal hesitate to use the word doodles but sketches.*

J *Oh no it happens all the time ultimately they have anatomical models on their desks as well but it's a kind of so inconsistent approach. It's a sort of like luck of the draw depending…and also as well…*

DY *A good clinician.*

J *…there ability to draw and like you say into great things like scale and context to…I mean even basic things like anatomy where are the kidneys anyway. There is a big issue. That's what we're doing with the study with patients we're trying to show them like this is where the kidneys are, this is the context of the torso. You've had a scan this is the disease we're looking for which is this renal artery stenosis which is a blockage of blood into the kidneys. But it's like you said before, colour, composition, shape, structure are other attributes that are often like almost subconsciously absorbed and couldn't be measured in a kind of cognitive reduction approach which is how size and approach try to tackle. Oh John you doing computer imagery why don't you provide a slab study analysing how many patients liked the beige one or the red one and I would be like the….*

DY *But then I what I would say, I don't like that image but in an emotional kind of context and yet some of the images I think are very beautiful.*

J *So do you think beauty is linked to information exchange or do think beauty is a separate entitiy all on it's own. Or is that too broad a question maybe.*

DY *Huge question, you would need a bout a dozen PhD to answer that one. I mean, I read something recently that 'Beauty was found in wholeness. To globe a statements, there is a place for aesthetics in science. Its a biggy*

J *I think knowing where everything is come from because it is a big problem with computer graphics particularly in their ability to replicate*

*reality almost and if we're talking about building in different aesthetic qualities to imagery that we've enhanced, augmented or changed surely we have a responsibility to try and explain this isn't real, this is an enhanced reality rather than actual reflection of reality. You what I mean I think that is quite an interesting question. Philosophical. Because I suppose it's a kind of reflective practitioner approach because you…I mean you just have to put out documentaries on the television and now it's very difficult to look at whether your working at looking at a foetus or whether it's actually a computer generated foetus on an ultrasound foetus but I think what you mentioned before which is an important point this scale of interpretation is **** it all has a degree of human input from the very beginning, even the MR itself is not infallible it's not perfect and then radiographers and then me and then the machines and the equipment and this catalogue of inputs.*

DY My main complaint or concern I guess was medical science, the human being just becomes another part of the machine but with we lose tract and what medicine is all about which is ultimately with that individual person, a human being now has a degree of integrity and humanity. I mean I know of other studies in the west coast where they found that peoples access to complimented therapies and it had a really beneficial effect on their health but it wasn't necessarily that the complimentary therapies themselves made a difference it was the fact that the person themselves the fact there was no waiting time, they felt valued, they felt better and it's the extent of which this kind of informational and educational process that their involved in also makes them an individual feel special, feel cared for as a human being and I think it's a potential to lend quite alot. You know your health matters.

J Yes it's almost like building a perception about the healthcare system rather actually relaying about the disease. You probably know this the actual have measurements as well. You know they have studies to look at the perception of the health care and it's important to the NHS peoples' perception. I'm sure they probably looked back how you go because you probably…your perception of healthcare reflects your perception of the government which reflects on how you look…

DY I heard a something on the radio 2 just as I was driving home in the care last night where, I missed the beginning of the interview but, they were talking about bed blockers and which that lady being interviewed quite rightly said I think it's an appalling way to describe anybody. To deprive them of humanity to refer to them as a bed blocker but it was good her say that.

J I think you're right though that's humanity and stripping out of humanity you know that's come from somebody.

*DY We know there's just…because of the associated ******** or you immediately want to know about who they were, what it was and…*

J The interesting thing about a lot of this is to do with light and way that all of it is reflected because the reason that that one is so horrific is because the light, it's the camera. I think the angle of instance is almost like directly back at you because it's the optical effect from putting in these keyhole cameras and the camera and the light. So there is no like side-lighting on the object so you get this horrible, you get no shadow basically.

DY When I've heard clinicians talking about when they go through there medical training something like an x-ray…I mean it has as a lay I wouldn't read anything from that MRI scan but a trained clinician might and probably has thought about disease but you hear medical students I'm never going to be able to read that but over the years you know they become acute at identifying parts identifying patterns or order and there's just a flicker on the screen that makes them curious that they are able to detect something at an early stage. So there is a subtlety and ambiguity I think more so in some in the images than in others.

J It's interesting, I mean MR imagery itself is a fundamentally completely different process from all the others because it's to do with the relaxation of these atomic particles.

DY Is that the horrible drink.

*J No that's for CTs and bariums that they give you to drink, a barium meal. Whereas MR it doesn't involve x-rays. Whereas x-rays sort of pass through you at different labellings and get the colouring. Whereas this, it makes all the water particles in your body fibroid at a specific resonance. It's huge, I mean I can't remember, it's like 20,000 times the earth's magnetic field of pull. I mean you can't go into the room with any metallic objects because it would just lift it out of your hand and go straight into the core of the magnet and obviously when the super with liquid helium so it's superconductive and so these magnets are like a drill they expand and contract so quickly and create a field and then they start taking the imagery and as the water particles or the hydrogen ***** muscle relaxes and the water content of each of the body parts on your body are different so as they relax they are recorded in a different way so things like air, water and movement show up differently so the reason the kidneys show up white is because they are full of blood and the blood's moving.*

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DY I don't know how anybody would have developed…where the ideas or the imagination for that kind of technology.

J Born for the atomic age

J *I mean it was probably, you probably trace back it was probably right back to the development of the you know… *****. But what I found was really interesting is that most of the…well the latest one in the NHS is Dundee is a siemens scanner. It's made by Siemens in Germany and they make all the scanners in the world in this one place and they fly all the ***** out there and it's part of the **** process to see how it's made when they go through the pitch. **** competitors in their US company and it's worth £1,000,000 per scan so it's huge money and that doesn't support all the other things that go along with it when they buy it so it's a big expense for the NHS so they have three companies to look at individually. You just hear it through us **** but the **** factory you saw scanners all lined up on the production line but the winding the coil in the magnets by hand. They were crafting the magnets. It wasn't as process that a machine could do to get that quality that they wanted to achieve so these had these hundreds little of Bavarian guys with beards and these huge long miles and miles of this copper wire wrapping it round this core which probably takes years and years and years of experience to get right and I mean it's a bit like buying a Roller Royce, you're buying a crafted, hand-crafted piece of technology which I find is really fascinating.*

1.3. Fine Artist X

Date: 28/3/06
Duration: 00:46:40

J So as I explained in the first part the second part is about dialogue and conversation and it is just an open ended discussion about some of the images you have looked at, digital animation and just discuss whatever way you see fit the logical, emotional and the overall understanding and maybe you can lead me through how you have accessed the images, maybe if we start with the more logical content and maybe you could take me through what you have looked at.

FAX I did a very sort of quick, try to take an objective look at what I'd been presented with and ignoring other people's stickers, so obviously I'm familiar with some of the images so I've tried to approach it fairly coolly, I actually made a little diagram of how the images are positioned on the screen and I just drew a little diagram just indicating the logical aesthetic understanding areas and emotional areas and I numbered effectively the numbers of the drawings or the images with those sort of general areas or where I felt they lay within those general areas, so for example if you are talking about logical react ional response to the images then we are looking at sort of four or five which for me are, how would you describe that one John, bottom

J Yeh the fuzzy one, the MRI 3D reconstruction

FAX Whilst it looks like it is a knitted image, it does give a pretty good representation of what we might imagine kidney exist in the body, not necessarily in terms of colour representation but purely in terms of form and how they are attached to other parts of the body, similar with the Gray's anatomy one it is in my logical section because it actually gives you a diagrammatic representation of, well somebody else's interpretation somebody else's drawing of a slice through a kidney which lays bare the sort of internal likeness, whilst you sort of don't, you somehow immediately associate that one, well I did with a kidney, it does has that sort of shape and form and then again I think I am looking at, the other one I felt quite logical in terms of its representation was the almost sort of grey dual chromatic red and black image almost like a silhouette it give you the sense that it is in perhaps in a dark space and that it is internal and it is representation in turn within the body, purely because of the lighting although it is not too representative necessarily of the form but it gives you sufficient information to make an association with kidneys so it is quite logical for me and to some extent the one above that top right one is the sort of cartoon like rendering which has an outline of the blood vessels and shows the blood platelets, I'm assuming it is a red blood cell which is moving

through that space, so again representation ally it actually means something to me logically. I think the other ones, again the very last one of the 12 for me was the sort of quite highly polished rendering of a kidney which is an internal structure to some extent because it is quite highly a visible item the way you have got the lighting reflecting off the surface it doesn't have a visual thing it has a very sort of glass like feel about it, and I think it is because of that it takes it out of the first image of the insides of the body, it actually removes it from that setting, that context and turns it into almost like an individual artefact so for me that is sort of representational of a logical fashion, does that sort of make sense. I mean in essence these three circles overlap and they aren't necessarily separate so you have actually got a cross over point.

J *I think as well when we come to do the prioritising it is funny there is one sits similarly on the scale if they are both twos, if they are both logical 2s and emotionally 2s they kind of fall into both categories.*

FAX *Funnily enough when I actually looked at it, I didn't actually, I think apart from two, they are actually separated out which was quite a surprise because I didn't expect them to be at all, I mean you can check it but maybe because I had a short space of time but I just did a very quick sort of summary and when I look back I was quite surprised to find that there wasn't much overlap in terms of the areas in terms of how I've categorised it apart from the last one which falls into the logical and also the aesthetical understanding category as well, so that was good, I expected to be a lot more cross over, maybe that is just me.*

J *OK, so that is looking at the logical ones, so do we want to talk a bit about the ones that had the most emotional impact or profound reaction?*

FAX *Can do, don't know how much detail you want me to go into, or do you just want as much as possible*

J *Just whatever you feel appropriate Nigel as much or as little*

FAX *For me the ones that cause the greatest emotional response, and it is possibly the same with others as well is the first one the sort of visceral looking image which is actually from inside the body but the other thing that struck me it could actually be an animal it doesn't necessarily have to be human, what distinctions does it have from an animal, whilst I know what it is I think I would be hard pressed if I didn't have some prior knowledge to identify it as a kidney, simply because there isn't enough information could be part of the liver or intestine or anything at this level, so I think that was basically the first one for me. Then the next one we have is the woolly jumper one, the knitted image because it retains some of that, because of that sort of characteristics of softness of some part of the image and part of the image and blurriness it still retains that sort of organic feel, that sense of being*

organic and in other words being perhaps part of the body where a lot of the other images are quite crisp in their rendering and they way they are lit, so this is quite flat, there is no light on it at all, it is flat in that sense even so it is quite emotional it has some echo of emotion for me and the other one, there is four all together the fourth, the third one of the, that is the, not an x-ray, a scan a MRI scan again I think I recognise, or I recognise it as a medical imaging scan simply because I've seen others but not necessarily the one that you have been doing as I've seen others, but it just has that feel about being a medical image rather than anything else and because of that it has other associations in terms of emotions, also it is very dark you have got these white silhouettes against a black background which add to that atmosphere and I think if you reversed the black and the white on that you would almost end up with an x-ray type image as well which again has that sort of feel to it and I think the last one was the white porcelain ring to it ceramic style of kidney, at one level it looks quite hard and brittle it looks like a calcified object which has been fossilised so it looks like a husk, it look like the shell of something else but because of the softness of the surface and the way in which the light is falling on it and the way you have got these soft shadows it almost has a lot more presence than some of the other sort of flatter sort of rendered and polished images so there are really sort of four that stood out for me as having a high degree of emotional content.

J So the ones that you haven't categorised do you think they don't fit in either of the, because there is the tomb rendered one next to the photograph and the blood flow one inside the body

FAX Sorry which was the last one that you mentioned?

J The one to the left of the tombed one, the blood flow with the light.

FAX No that one fell into my aesthetics and understanding lot

J Okay the third category the overall one, okay

FAX Because it could have, it didn't really fit into the emotional, of any of them it would have gone into the logical one, probably sitting around the board or something between logical and probably in that cross over in that grey area of the two.

J This is the blood flow ones

FAX Yeh and then to you want me to move onto the aesthetic ones?

J Yeh

FAX Or do you want to sort of tease out a bit more

J *Yeh well that crisp one the one at the start, the photograph, do you think that fits into, does that fit in to your overall*

FAX *Yeh that comes into the last category*

J *Well lets get into that we can always rewind.*

FAX *We can always come back. Yes in the final category aesthetics and understanding issue whilst each of the images does give you some levels of understanding and a sense of a degree of help something can be rendered with a particular aesthetics and stabilities, the ones that stood out for me were the two rendered one on the first screen, in terms of overall sense of aesthetics and understanding I think the reason for that is because I think you have got these, whilst it is almost a cartoon type style of drawing you have also got the main sort of parts, you have actually got an awful lot of information there even though it is even rendered in perhaps a few, two or three ??? layers and even within that it gives you a sense of depth to it as well as a sense of quality of the organic nature of the object and even though it is using a minimal amount of information, the second one was the one we have just talked about the top left hand one on the third screen and again it gave me a sense of we are looking at something internal to the body (a) because I'm familiar with blood platelets, red blood cells plus you also get a sense that these things are actually flowing they are not just suspended in space they are actually, even though they are static you do get a sense that they are flowing, they are actually moving around and then the third one, the last one here and again it is similar in some respects but I think I prefer the first one*

J *So do you think that one has no emotional content but it has*

FAX *For me it doesn't have perhaps a fraction but not the major at all compared to some of the other images and again that one the final one because it is a fairly crisp rendering and the lighting it looks like a glass blown object but again you can see the workings the internal structure, it is almost like something that has been captured in this sort of state a bit like what I describe as the ceramic kidney, funny enough with some of the highly rendered ones you don't necessarily, well I don't necessarily overall get a sense that they are actually based necessarily on scans in the sense that raw data was, almost something that could be made up, just modelled without coming from scan data in that sense, I don't know why that is but is just stuck me*

J *The middle one on the middle board*

FAX *I haven't really categorised that one at all actual I think that is one of the missing links actually I haven't actually put it into any, I think because purely because of the perspective and the way in which you are actually looking at it, it becomes something else entirely it is almost like a work of art in a sense*

J A complete abstraction in some ways

FAX Yeh, it is something like Chardaris could have produced as well, pieces of work or

J So you think in some ways in the absence of emotion and the absence of the logical you almost enter the surreal, do you think?

FAX Yeh it is removed almost entirely from the body in that sense and I think it becomes then something else entirely whereas I couldn't say the same about all the others I think that is probably the only one for me, it is not truly representative of the general workings of the body, does that make sense

J Yeh that is for me to make sense of it. Okay so I suppose the next little task is to put like a score on them from 1 -5 of what you feel, one being most emotional and five being the least and one being the most logical, so do you want to

FAX The problem is that I have only got four in one category and three in the other

J Just stick with whatever you feel comfortable with.

FAX I could add some more if you want 5

J May set 5 so it keeps consistent, if that be your emotional ones so 1 -5 for emotional and then make the blue one your

FAX Do you need an initial on this or do you

J It is all right if you put yours on the bottom rather than on the poster Nigel it should be all right or the bottom of the poster.

FAX Okay, so what is the next one then.

J So this one is information impartment or the logical.

FAX All right.

J Did you not put the knitted images as the most logical?

FAX I didn't put them in the order that I thought when I was

J Sure

J It is funny because Sandra ended up scoring them all rather than putting a scale of 1 -5

FAX That is going to throw your system out completely now

J Well this is just a scoping exercise so it is just to see how people

FAX Okay, next

J Well that has kind of covered the overall tasks, I'm not saying you haven't selected any of the digital stuff of do you have any views on that?

FAX Do you not need numbers on the others, the third category

J Sorry, the overall yeh, although no I don't score them

FAX You haven't scored those

J No we are not scoring them, but you can of you like

FAX Well if it is going to mess your system up

J It was more discussion points on the wholeness of each image rather than to score them

FAX Okay, have you not scored them with the other people?

J No, I didn't, do you think I should have done, my idea was just to try and score the emotional and logic one and the wholeness was more open ended.

FAX Okay are you not testing the sense of others in terms of aesthetics as well and understanding or are you categorising them as well?

J Well I mean the aesthetics I suppose it depends on how you approach it aesthetics could be a combination of the emotional and the logical so rather than trying to sort of pin that down it was just to try and make it open ended, I mean what was your thoughts on, what was the, you selected the 3D blood flow with the light, the 3D glass kidney which is that one and what was it, the 3D blood flow was the, what was the three you selected for overall aesthetic?

FAX It was this tombs kidney up here, the blood flow and the glass, I think those three for me, strange enough it takes aesthetics and a sense of understanding of what is potentially happening, rather than the other which does give you a sense of something happening within tubes and things, I think it is mainly because, I think it is to do with the fact that they are 3D even though this one looks like 2D you get a sense of 3D and I think the thing that give me more information is this one represents in 3D from mainly that is just because of my background, em although the 2D one up there it imparts quite a lot of relevant information so I think that one is to the point for me it is definitely the

blood flow and the glass kidney and the two kidney which provide the most information in my understanding.

J *Do you think there is a link between the ones you have scored emotionally quite high and ambiguity or do you think they are not, the more distant they are from morality do you think they are more emotional, you have scored them, the way you seem to have scored it is the ones that are actually a replication of reality are actually the most emotionally driven because you put the scan, the MRI scan and the photograph as the two with the highest emotion*

FAX *Did I*

J *Yeh you put number one as the photography and number 2 as the MR scan and 3 is the softly rendered kidney*

FAX *I think possibly because the sort of ceramic kidneys it removes all the associations with the internal workings of the body, it is not red and it is not associated with blood, you have sort of removed all the associations I think but you still left the form so that is the clue there so it almost becomes something else and it is not, it is slightly removed in terms of emotional stakes there whereas the ones that are by association that was has an association with x-rays because of the nature of the tone, quality and the way it is presented and this one because it is a representation of reality*

J *Photograph one*

FAX *Yeh the photograph, I did have a look at the moving material, I'd started making a few notes when you came in John, do you want me to briefly talk about that?*

J *Yeh*

FAX *The thing that struck me was the content that one was indicative of similar, the way in which subtracts a medical function or a medical illustrative video might be produced by a medical company/organisation to illustrate*

J *so do you think it lacks soul when it is about just pure information impartment rather than*

FAX *I got the impression that the first, not necessarily this one but the one prior to that, yes I got the feeling that the section tried to impart the information whereas I think they all have to a fairly large degree, although you can appreciate some of the quality is aesthetic quality in that last scene, whereas they tend to be a bit more illustrative in one sense and some sections that reminded me of the film Fantastic Journey, I don't know whether you have seen that, you know the one?*

J Yeh, I think the guy that directed that just died last, yesterday or something

FAX There is a few versions of it but it is good in a sense that you get the impression that you are inside the body and this one again imparts more illustrative than perhaps the others were

J So would you say it was higher, low in emotional content but high in information of logical impartment?

FAX Yep

J And in terms of the overall aesthetic where does it sit, is it just

FAX Em, well it is difficult, I mean, I think for me excessively it worked quite well this sequence

J Do you think that is more mysterious?

FAX I think it is because, it is less like toughest is always best, open a bag, I think it is because these tend, the nature of them they tend to look very homogenised in terms of the individual qualities that the blood cells have, it is almost as it they had been, whereas the other thing is you get a sense of depth in terms of lighting depth and so on. I think if it was fully rendered in the same way as you have got the still image in a sense of with adding in all the sort of visual stuff much as it might appear inside if you stick a camera down in the arteries you know that it is not it doesn't necessarily but you tend, but that could in fact we close to the truth than perhaps the others because you know that your veins and your arteries don't have transparent walls in that sense so you know that you are looking at something which is, there is no ambiguity you know you are actually looking at something that is rendered, rather than is it or isn't it.

J Do you think that is important that ability to try and explain to somebody or use the imagery whether it is real or not?

FAX That is a difficult one that, I think it is potentially a greater awareness or association with something that is close to relative something that is rendered but not necessarily trying to achieve photo realism.

J I mean Sandra brought up this point that it is important to try and know where these images came from to give them more emotion, if you knew if was from somebody then that would be more emotionally loaded.

FAX That is an interesting point, I mean I think if you have even a false name underneath the images and say and maybe even put whether they are sill alive or whether they have died I think that would have significantly greater impact.

J *I mean the other thing is this whole process of automation versus a craft process, we talked about that as well with Sandra knowing that something has been hand crafted bringing humanity to the imagery is something that would offer, would increase emotion and obviously hiding the information exchange if you knew, well not so much if you knew but this whole question of bringing humanity to something that is quite alien or kind of machine like, do you think that is important*

FAX *Well I wouldn't necessarily agree with that in the sense that you are producing 3D renders as a craft in itself as well and in the same way created a piece of jewellery as a sculpture as a craft or can be there is a craft element within that.*

J *I just mean from the point of view that obviously we have got images that have come straight off machines and you know it is images straight off the scanner and images that have been interpreted by me and then you have got Gray's which is very much an interpretation using ink and pen, pen and ink rather to interpret, so there are all these different levels of interpretation.*

FAX *Well in one sense you are just using a medium which is natural to few in terms of describing, the internal working of the body in the same way as Gray's Anatomy does by using a pencil.*

J *I suppose it is historical as well as Gray's Anatomy was alive today, Gray's was live today would he be using computer generated images to enhance and educate*

FAX *I'm sure he would*

J *So this is*

FAX *I suppose there again the other issue is what is your target audience and if it was medical students it might be, are you trying to hit the same audience a large section of differing audiences in one go or are you trying to impart information which is only geared towards a particular audience?*

J *I think it is an important point, who is your target audience and things and I think obviously it is targeted at, it has got a heavy bias towards patients but I think we are patients in some ways and I think aesthetics plays a part in all our lives and the quality of the imagery and the way it is reflected, you know in making judgement that if it was left to this kind of reductionist approach aesthetics would or interpretation wouldn't be accounted for by an artist so it is trying to identify probably the emotional and the logical can be affected by the way the image looks and the holds of the image I think is important, I mean I know we have broken today into three discreet areas but if you are trying to categorise*

with the overlaps is quite interesting Nigel with this whole process of overlapping components

FAX *Sure, at what point does the Gray's become view to enhance that what point does that become more interesting in terms of the aesthetic quality of the image and I think the aesthetics whilst it contains elements of aesthetic qualities it is a drawing, I think that is unavoidable because of the nature of the medium being used, but obviously they try to avoid that emotional association by adding highlights or some are done through shading at some levels.*

J *Do you think, one thing about Gray's is that none of these images have, which is has is text do you think that is an important attribute as a component?*

FAX *Well as soon as you stick text on something it becomes an illustration almost and I think that is one of the issues, I am just thinking if you were to remove the text from Gray's then it becomes a bit more a future sort of photo shop and reproduce it.*

J *I suppose Gray's was born from a era from engineering and innovation and map making and in history they were all connected and they were in pursuit of that truth and*

FAX *I mean the other reason as well is why they are necessarily drawn that way because of the printing processes involved, or the plates that they had to produce it might be interesting to see if you could render one of yours with a similar*

J *Yeh, using the 3D, I think that would be really interesting I mean that is part of the Princeton Collaboration because that is what they are trying to do they are trying to make this kind of illustrative drawing like shaving on 3D geometry and that might be something to throw into the practice to develop from this. I'm interested though as scoring as one for intuitive or a logical and very low and middle of the road for emotional and that wasn't what I expected I thought that would have an emotional content*

FAX *With what*

J *The Gray's*

FAX *Oh really, is the scoring quite low in that, for me that is quite interesting, I think because you know it is a drawing it is one step removed from this, you know it has been drawn from something and I think that*

J *It would be interesting to do some renderings that are actually photo realistic that replicate the high emotional goal context but in some ways it is interesting that that has a high emotional content but it doesn't*

mean that you would want to view it or access it, it just means it is having an emotional reaction but that is a negative emotional reaction rather than possibly a positive one, it maybe something that is naturalistic and is embedded in us that scares us, you know what I mean, it is blood it is gore its guts it is highly reflective it is kind of slimy it is things in our bodies that we don't see whereas this is all, it is good word and it is sanitised you said earlier and the sanitisation process but you can got too far and obviously make it like that is so crisp and sharp that is ultimate sanitising of the data

FAX *But it also makes it feel cuddly in the sense that the image is rich in colour and everything is sort of self contained in a sense that you don't have the same feeling that you have with the topic nature.*

J *It is really good this though because it is breaking the stuff down, it is just like cracking open the image and laying all the bits out and comparing all the bits to the other ones and seeing them all together as well. Do you feel that, I mean the one that, the lighting on the one that you have put as number 3, or have you not scored it, you have just seen it as an overall*

FAX *Which one*

J *The one with the kidney in the top left of the third board, do you think the light plays a role on that and that you are actually looking in the light and the light is kind of predominant illumination of?*

FAX *I think so, I think the light*

J *It plays a role, do you think it plays a role in a lot of them actually, most of them?*

FAX *That is interesting, oh it is because it is in the most aesthetic understanding category that is why it doesn't have a ticket on it,*

J *I'm just saying that one has got a kind of exposed light and in some ways light plays a role in all of them particularly the 3D ones rather than the 2D ones.*

FAX *Well I can see it is the light, the lens blur and the lighting, people are familiar with that and they get a sense of relative with that but you know it is not, actually it is not real but you get a sense of it could be real because of the, you have got that association with reality basically, it is that which grounds it.*

J *Yeh and maybe that reality, I mean that is one you kind of said looked like porcelain has a very absorbent surface on it, it takes advantage of sort of surface scatter which allows much more subtle lighting and shadowing.*

FAX *It is like shadows, I mean shadows give you visual clues about how someone appears and how it is placed on an object and an association with an object so I mean if you were to remove all the shadows from that it wouldn't have the same sort of feel.*

J *Do you think it looks like bone?*

FAX *Yeh it does actually, or as I said something that is fossilised*

J *And calcified yeh*

FAX *It has also got a waxy feel to it as well, it is quite waxy, and one of those machines, prototype sort of thing as well.*

J *Does that make it feel that you want to pick up, is it tactile?*

FAX *Em, it feels very real*

J *Maybe that is what makes it very engaging?*

FAX *I think so, I think because a lot of the other images they have black backgrounds, they have very dark backgrounds and they are sort of floating in space somewhere, so apart from the blood flow and the ceramic thing those are the only ones for me that appear to be in that sense all the rest have this sort of ferial sort of quality like they are floating about.*

J *Okay good, that is plenty Nigel*

FAX *You will have to transcribe all this material*

J *No I'll probably have to record it and go back to it later and go back to it later and pick out the key areas, but it is good just to have it on tape though it means I can quote you properly and*

1.4. Designer W

Date: 28/03/06
Duration: 00:47:35

J *OK, so stage 2 Louise, what I'd like to do is maybe let you lead a little bit of this but obviously maybe go through the kind of key areas, the way I have structured the second part is, it is orientated round dialogue and conversation and the three topics that I mentioned earlier and also once we get to the end of the discussion I would quite like you to try and score some of the images but initially we will just talk, if that is OK and as you suggested you have only maybe got through some of the images on one of the areas which is emotional, so maybe that is where we should start and if you want to maybe talk me through in a logical way you feel it fits the way you viewed the images we will take it from there, so what is your initial thoughts on the emotional side of things?*

DW *I found myself just gently scanning all the images to sort of see what was there and I actually let them trip back to me I didn't have a way of working with them and it was just what my mind says about them and I find that the first images that I could articulate out of the last two was the bottom right one and when I look at it I get pulled in mentally, I could feel myself being part of the process, I liked the movement that was there, the implied movement that is in there and I felt that I was one, you are just going along, it wasn't that there was a frantic pace to that movement but there was movement it was an active, although it was a still images there was movement in it and I find that really interesting and was really curious about it, but if I'm honest I would also, I had a response to the one above that I can't articulate what the response is of that.*

J *The photographs?*

DW *The photograph, yes*

J *Do you think it was quite a real representation*

DW *Yes I find my mind wanted to try and say, what is it, I want to know, I do want to know what it is I think that is the for the rest of them I asked myself those two questions, what is it and do I really know what it is, am I really that interested and I'm not quite sure what it is supposed to be telling me, oh that is inside, that is part of me, oh that is, it doesn't offend, it doesn't put me off but it doesn't really engage but there is something that is curious about it and the next images that I went to was probably related to this and gain it was about movement, I could really place myself in this void.*

J *This is the flow with the lights in the top corner?*

DW *Yes, and I find it very calming and I find I could see myself in that space and I was actually that cell, just being held actually, although there is movement I was being held in that space and not frightened by it and I was comfortable with lots of other things round about me, I had no response to this illustration whatsoever, there was just nothing, I think just emotionally detached from that one, I was curious about the illustration with the white background because I think the visual information is really interesting and that made me curious and the red wasn't it was comforting it wasn't a threatening red and that might be because of the texture that is in there but my mind didn't like the white bit because it didn't make sense, it didn't make visual sense that was sitting on a white background because well it seemed out of context there was no context there, it draws you in I think it makes you want to go up closer to see what it is all about. I found the very centre image next to the illustration, I found it very artificial it reminded me of an insect but an artificial insect and I thought it was quite odd.*

J *Do you think your emotions are linked to the context, there is very little context and it is hard to build an emotional*

DW *Absolutely, I think you are absolutely right there John. This image I'm curious about because it is so dynamic and it does imply movement too but of a fiercer kind, I find there like little explosions that are there and it is quite aggressive*

J *So do you think it have a emotional engagement then or do you think it is more a logical sort of impartment of information*

DW *Emotionally I don't I think, emotionally no, I'm just curious about the aesthetics of it, I find this*

J *The two kidneys the sort of red rendered one*

DW *I find that it is just single words that come to mind, blood, cold, angry, dead, it is not a piece of art, is it an experiment, it does imply that it is solid but there is a morbid humour to the whole thing too I see it is animated but the two seem quite vicious creatures.*

J *How did you find the image on the bottom right, the one, the sort of beige coloured one did you have any emotional response to that or was it*

DW *Again it is about the context isn't it and that is not the object but it is something and it reminds me of a sheep's skull for some reason but it looks too pure it looks like the pebbles on the beach, just smoothed by the water, the constant hitting of the water, I found the top right image too much like print*

J *This is the line orientated one?*

DW *Aha with the red, I don't know why, why is that better and why is there no differentiation between*

J *Do you think that one has any emotional content or is it just an impartment of information or is it neither?*

DW *Emotionally detached it is just visual information to me, there is no real substance to it. I think that one reminds me of two things, under a microscope as part of an x-ray and that again is about popular culture I think about the images that you are showing, a TV series, I don't really have an emotional response to that apart from it is familiar and I am comfortable with it, but it is not because of that, it is scientific it is a scientific image, it has no meaning I have no relationship with it*

J *So you think it is more reflective of scientific truth*

DW *No I think it is just a snap shot.*

J *Just going back to the more schematic one, so you said you didn't have feeling, any emotional link with that one at all, do you feel then that one sits more as an impartment of information purely and it is a non style or do you think it is*

DW *I'm not quite sure, I think it could be, are you talking about the centre one*

J *No the one to the left the Gray's anatomy*

DW *It is the type of thing that I look at an need to know about it or if I had to understand where all this was I would have to study it, again it seems a bit odd to me because there is no context because everything links in the body doesn't it, so it seems a bit strange that I would just be looking at this one section.*

J *So would you say it is quite soulless*

DW *yes it so just like an x-ray, I found it a lot to take in in ten minutes and I thought when you first look in the room it is a nice amount of visual information but to take that in in ten minutes and to give two different responses to each of those was very difficult and I didn't approach it quite logically because there is too much to deal with in that time spot but I could now tell you where I had a response to.*

J *in terms of images, we have maybe talked a little bit about the emotional content or lack of emotional content, we have talked about some of the ones that impart more information or are close to more of the scientific type of imagery, in terms of how they function as a whole combining both these attributes if you can call it that*

DW I think there is something really interesting about the fact that you do have Gray's anatomy which is a flat 2D and very clear labelling I think as part of a story would be necessary because I find the same with all of them, what does it link, what is the story, there is clearly a story that is round about it and my mind is curious to know what that is, where does it begin and where does it end, because I've got no time to write that story through each of the images and this collection of images doesn't tell me the story I think each of these images is a story as a part of its own story

J Do you think, do you have any interest where they came from?

DW No but I am interested in the process so I find I like that care, I don't know what it is called but this one, if I want to know the journey that is involved then these are the ones to explore, this will tell me where, it will take me through the stages and the process that is involved.

J Do you think because they have got implied movement that suggests maybe

DW I think, I am going to contextualise with your project in terms of being ?? I think because it is living and I think because it is active that it makes sense to see things with movement with them, I mean I'm a living person but it is nothing inside me so there are two living things that are there.

J So do you think the more static imagery is lacking in soul or lacking in emotional because it is a non contextualised soulless shape or a piece of anatomy

DW yes but if you want to go into more detail lets not run through the whole process that is involved but we take one aspect of it, I think that is where these two come across well together, I think that this is something you would want to know, that type of detail then that option should be there and then to take it from this into here I think that is a really powerful image actually

J So do you think combining textual information with more simplified.

DW Yeh I think this is the journey, this is the generalisation and it is non threatening but I think with the story that unfold with disease but the reality is it is threatening so you can't hide away from that, so how do you balance that to make someone expecting of the circumstance that they find themselves in but manage that because the level of fear that involved because if I look at this one I'm thinking don't show me that for goodness sake at the very beginning I will be having kittens because it is vicious, it is quite, it is angry there is an asset that is there, but I could cope with that, maybe smaller and maybe just in a little way because at the moment in this story of all the images it is giving the same size and the same attention so the scale is maybe, you maybe

wouldn't give it on that scale, and I find this, this and this I find maybe part of one story or one stage in the story, I actually find that disgusting they don't need to know that, that is a doctors job to understand that side of it

J *Do you think, would you in terms of rewinding the process of the image generation do you find yourself thinking how close that is to reality and how close that might be to how I look or is that kind of truth important or not important do you think?*

DW I think there is enough truth, I think you demonstrate your understanding of the situation with the texture, shape, the detail that is there, the fact that you are giving different snap shots of it, I think what I like about some of them is the fact that it is recognition that it is a process and that it is active because in some ways this implies this can be stopped like if you have got a static image, here is a cut and dry situation this what we have got this is what we have to do because this is

J Do you think the Gray's anatomy one looks slightly engineered in the way that

DW I'm quite happy for it to be like that actually because it tell me information that the other ones don't and I need that to ground it to be honest

J So maybe there is a place for different levels of imagery?

DW Yeh

J So some might be more emphasis on emotional than emphasising the mechanics and combining maybe imagery that combine the two?

DW But it depends on the question that the person asks, I think it is all in their background the questions the patient might ask within the situation that they find themselves

J In terms of the printed stuff, did you get a chance to look at any of the digital stuff at all or did you just focus on that?

DW I focused on that as I felt that, and I don't find it interfering. Is that how blood works, it spurts and then spurts back is that the beat

J Yeh, yeh, do you find that quite artificial or do you feel

DW It feels okay

J Do you think it has any emotional insight or is it just more the mechanics of what is happening

DW It has both because I'm calm looking at it so that is emotional but it is telling me about the ?? I think the colour I think the texture, sometimes the rush happens although I'm detached from it but I think if I had something wrong there would be this rush that is there thinking oh and I would want more information, now that I have seen that now I wanted to go and find more. I do like the film to tell me the story.

J Do think that the absence of sound is a hindrance or a benefit or

DW Well would it be a narrator talking you through what I'm saying or explaining, what would the content of that narrative be and when would this be seen, would it be seen when I get home or something that was done with someone else there, is it something that is an electronic resource so is it part of counselling?

J Do you think it is the actual movement

DW The other thing is do you have someone who can put it on and there is someone who is talking you through it and that is aesthetics and I'm talking about the aesthetics I think how a voice is an aesthetic and I think the person and the character and personality of that voice is also an aesthetic so it is not just the content of the narrative but I do think that is the start of something really powerful.

J Okay, well moving on to the next phase, move on to other side of the experiment is to look and try to score some of these images in a scale of 1 -5 in the two categories in the two initial categories so the first one is emotion and the scaling which images you feel, at one end of the scale just number one is the most emotional or has the most emotional content and the 5 which images has the least and then second to that is them doing it in terms of imparting information do you feel number 1 imparts the most information in terms of structure and then 5 being the one that imparts least. Just help yourself there, there is a marker and maybe the red the emotion and the blue one

DW Just put these up

J Feel free to talk, think out what you see in terms of

DW I know which one I think is the most emotional

J So that is the one with the light

DW Least emotional it is a cross between these two

J Maybe you ought to say which is the second most emotional

DW Yeh this one here, not sure about number 5 actually, now what is the next thing

J Is the one you feel is the most logical and give the most insight into the structure

DW Structure of the kidney?

J Or not necessarily the kidney but the disease or the anatomy it is trying to, I suppose it is

DW So it has to be Grays' anatomy because I know exactly what that is there is no dispute in it

J Okay you can include that if you want, you can change them around if you

DW I suppose in some ways that is number 3

J In terms of look

DW Yeh, I would say the same as 1 as it says the same thing

J Okay that is fine, so you score that as number 1 for emotion or for the two

DW Now here is the thing I find emotionally interesting, but that tells me about it, so

J I suppose in some ways

DW I'll put that there to differentiates from the moving image

J Do you think the still allows you to build a lot of stuff in your own head rather than have it presented to you?

DW I do actually I find that allows me to place myself where as that seems a bit detached and that doesn't so I'm going to have this as number two for the logic and keep the still images as that allows me to enter in at a personal dialogue.

J So you have got one, two and then three would be

DW This tells me about

J Do you think that the logical stuff and the emotional stuff are inherently linked or do you think they function independently, I have tried to split them up in this experiment but that may be the wrong thing to do and I want to tease out ?

DW You see I am not emotionally attached and I think that is quite flat the emotional response to that it is not really dynamic but it does when I take away the red it does tell me about the structure, this tells me more than this, related to that, what is this remind me, the least information

J In order of merit then 6 would be the next one but we are only going to go on to 5

DW This is where I'm going to find it difficult because the top three give s me most information and then going to the other extreme so missing out maybe 4,5,6,7,8 and maybe, see there are 12 images

J Unless you feel, but if you want to go 1-3 that is fine too.

DW I probably want to give what gives me least information

J I suppose you said the one in the middle wasn't really telling you anything

DW This here?

J Yeh

DW Neither does that though

J The one, the glass one that does give some insight into the structure

DW Yeh but I think that one sits in between and I think it is mid range so if we had 12, I would probably says it sits between 8 and 9 in that range. This photograph tells me that this is part of the inside of an animal or a human but tell me no more than that, so you would have to, I find the scaling quite difficult

J Do you feel that a scoring system for all the images would be more beneficial?

DW Yeh, in my mind I need to sort, but I would need a little bit of time, but looking at them all intuitively there is no

J Do you think the white one with the red, does that give you any insight into the structure?

DW It does

J So do you think that is maybe a 2 or a 1 after the Gray's

DW No because it is a bit too protected as an image I find that this tells me more

J So that would maybe the 2 then?

DW No 2 is over here

J So maybe your 3 then? I mean that one there is closer to the scientific truth rather than the creative interpretative truth

DW The thing is my mind doesn't really care, and I'm not really thinking about it, it is just what is in front of me and my personal response irrespective where the image originated from, what gives you the most or least information

J *It is basically to see as well the top 5 interpretative or the top 5 most logical and give you the most insight into the structure*

DW *So it is the top 5 not which is the best*

J *No the top 5*

DW *And emotionally it is the top 5?*

J *Yeh. In terms of, it is something I haven't asked you to score in terms of the wholeness and without breaking the image apart and trying to get insight in trying to get some of the components that make up the whole which image would you think functions best as a whole, touch on some of these issues on emotion, or impartment of information but this is probably quite hard to do and you can't categorise one or you feel*

DW *I think the fear that must be in someone when they have a disease I can't imagine*

J *Even just forgetting the context not looking at it from a patients perspective but looking from a more visual perspective almost like a selfish aesthetic rather than, I mean it is an opened ended question it doesn't mean there is one*

DW *I don't know I'm looking for a story in one and not looking for it to be within one I'm looking for about 3 or 4 to sit together and for me that would be, so if It gives the story for me it is the bottom left.*

J *The sci fi looking, the crisp one?*

DW *What is it called?*

J *It is just a 3D blood flow one*

DW *And the other 3D blood flow it is these two, Gray's Anatomy and the*

J *The rendered one?*

DW *No but I'm pleased about the one that is underneath and I feel it is there for me but I have to say this is part of the story too, what is that one called?*

J *It is sort of the MRI scan*

DW *The MRI scan, they for me are the ones that tell the story, the rest can say anything and that would be my one.*

J *So you feel it would be important to try and give more insight to the story or the background of what the images are about in some ways, if*

they were organised in such a way there was more an obvious narrative would help?

DW *Yeh and I think that you naturally ask questions of them.*

J *The other question, how would you define gives you an emotional response, I mean when you scored them emotionally looking at something, what would be some of the attributes that make you feel emotional about an image?*

DW *How quickly it transports me into that mental space, so the image can take me into a minds eye and allow me to be in my minds eye quickly, that has done it*

J *Well that is more or less it Louise you have talked for 47 minutes which is great and I hope we have got most of the stuff at the start as the window is open but I think the spike is quite good.*

1.5. Architect T

Date: 29/03/06
Duration: 01:03:05

J *Okay so you've kind of had chance to look round Simon and get a feel for some of the pictures. What I maybe want to start off with is more back to you to maybe talk me through what you thought of some of the images. It's up to yourself but maybe go through in terms of first of all the more logical orientated ones, you know talk through the information you drew from them. Do we want to start at this end or which way did you did you do them, maybe that would be the easiest thing.*

AT *While being brought up in the western tradition, I am sure most people start at the left and work along, you ought to get somebody, one of our Arab colleagues and see if he starts at that end and works that way but yes I did the naturalist thing and started at that end and then worked the way through them and I think probably as a sort of overall pattern I felt that the more emotional ones would be at this end, just generally speaking. I am not sure whether its because they were the first ones that I came across but I don't think it was. I did feel that probably and even looking at them now I think that for me the two emotionally strongest ones were on that pile and emotionally the least interesting ones were at that end but I don't know whether you arranged them in any sense.*

J *No they were actually random. It was just totally random although I don't know if there is such a thing there is always probably some sort of influence.*

AT *In terms of information, do you want me to think of it in the information sense first.*

J *Yes maybe the information sense.*

AT *Number one, I didn't get any information from that. This is the photography. Yes. The top one. Number two, the one underneath, I associated with that.*

J *Ok.*

AT *So I tended to interpret it as being informative, but I then realised that maybe I was thinking of it as being informative because I knew that was, so I am sorry if that spoils the sort of thing…but you can easily read it as being to do with blood corpuscles because I referred back to biology lessons in school and the shape the blood corpuscles are, so I*

interpreted it as being about blood moving through the blood vessel and I also…looking at the branch coming in from the right hand side, I sort of interpreted that it might be about constriction as well so I was getting blood vessel, blood flow and constriction from that. Beautiful, coming back to the emotional content of that in the next bit but in terms of pure information that's what I got from that.

AT *Number three, top right up there. It just looked like a screen print to me. It looked like something that somebody might put up in an exhibition and not actually expect to be informative at all. It was just sort of like you know here's a screen print of the cut sections through the kidney that I did in evening classes or something like that and so I didn't…my response wasn't really to expect any information to come from it, that it was somehow done for an aesthetic purpose rather than informative one.*

J *Sure.*

AT *The one underneath, I am not sure in terms of information about this one. I am not sure because I am not sure what I am looking at. If I was told, which I am pretty sure they're not, but in fact because there's three of them that if I was told they were diseased kidneys I would think oh god is that what a diseased kidney looks like and I know that they are not kidneys so I am not sure what they are so therefore I am not sure what I'm supposed to be seeing. If you told me what it was I can imagine that I'd think goodness is that…you know whatever it is, a pancreas or a pituitary gland or, my biological knowledge is so scarce, I don't know what it is but I do get the sense that I could, if talked through it, find it quite illuminating about what the changes…because I…it looks to me like it's diseased rather than healthy and with explanation I feel that it could inform me about the physiological changes in particular organs when they are diseased. So I can see a great potential for that being informative but not sure whether I can assess it without the knowledge.*

AT *In many ways I found number five the most difficult. Maybe it's not too bad in terms of information but because it's so stylised and because it's so redolent of school books and text books of the past. That all seems to me to get in the way of it because we used to have to do drawings like that in school, in Biology lessons, not quite like that because that's obviously an engraving or whatever but the thing that you are left with because I did Biology into the 5th form, I didn't do it afterwards but in 1st, 2nd, 3rd and 4th year all you got to do were things like drawings like that in your school book but then when you were in the 5th year you might chop a frog open or something like that and you realised what you were drawing related to but you know doing the drawings just on their own is completely useless because you had no idea at all what these kind of shape bits might be but it was only when you saw the real thing that you started to realise what the artist had tried to convey but were left with the feeling that the artist's drawing was next to useless if you didn't have the*

real thing to use the drawing as a reminder of, if you see what I mean. You know if you knew what a cross-section through a kidney was like, then you saw the drawing, the drawing would analyse it for you and somehow represent the reality but as a stand alone representation without reference to the reality, more or less useless I think. I'm stumbling a bit because I am not sure whether I am expressing myself.

J *No. Absolutely fine.*

AT *Then the next one I can't see anything really different about it from number two really because I see it as being either a different angle of the same shot or you know very much a partner with that and as being more or less the same.*

AT *The one after that I interpret it as being either a kind to or a traditional x-ray with maybe dye injected into the kidneys or something to show up some abnormality or something like that. Fairly impenetrable, the sort of thing that you'd need the specialist to stand alongside and point out, you see this very grey area here, that means you've got terminal cancer and I estimate you've got five and three quarter weeks to like and you know get the hours in order and you're expected to stand there with a stiff upper lip. (Note: Play acting) So it's sort of specialist information that's not accessible to me as a non-trained…a person who is not trained in how to read these particular specialist media like x-rays and things like that.*

AT *The next one, number eight at the top, again, I'd put that in with these other two but in some ways less informative because for me it's like a sci-fi image that has aesthetic beauty that doesn't really inform and I think also that these become a lot more informative when they become animated because then you see the flow in the way that the geography of the vessel is affecting the flow and presumably you also see the backing up of the blood when and when there is a constriction and those sorts of things and it all becomes so much more informative than in the still image, the movement it you know it enhances it enormously.*

AT *The one underneath, I didn't know what information that I was supposed to be getting from it. It looked like kidneys but the links between whatever central pipe there is on the two kidneys they seem distorted, constricted and diseased and I'd need to be told what that indicated and then the one at the top right over there, I thought this was clearly informative because of the circle around the constriction but to be honest I felt it was very simplistic and it was the sort of information that your consultant could easily sketch onto a piece of paper with a pencil and say…or even the word constriction without the need for a visual aid brings up an image something like that, if somebody said to me you've got a constriction in your artery. I would have absolutely no problem you know envisaging what constriction in an artery looked like and my mental picture would probably have been as simplistic as that so I didn't feel that that was offering me anything that I couldn't…it was a bit*

patronising to think that it was worth giving me an image like that because it almost suggests that I didn't understand what the word constriction is, if you see what I mean.

AT *Then the last two, I found the one there very enigmatic, it was quite sculpturally intriguing but it didn't immediately impress me as offering much potential for being informative because it seems to reduce whereas the traditional engraved textbook image at least tries to explain the component parts of a kidney. That just reduces it to a sort of marble block and doesn't even breakdown the component elements of the kidney for me and maybe it shows something about the blood flow vessels coming into the kidney but I don't immediately find that an informative image and then the last I found very beautiful, I wrote down on my thing Richard Attenborough, it's a bit like one of those jelly fishes that you get on those wonderful television programmes.*

J *Yes natural history programmes.*

AT *So it's very attractive and I can imagine it being…you know that is the closest I think to a sort of updated, high-tech version of that you know because it's obviously showing the same sort of transition between whatever it is, the filtering part of the kidney that cleans out the crap and the blood flow coming into it and there is sort of…these interfaces and that seems to try to convey those three dimensional interfaces…those interfaces in a 3-dimensional way within the kidney so I put those two you know almost in the same category as you know that would be your textbook illustration for the 21st century where that one was the textbook illustration for maybe the 19th century using the technology of the time, this one uses the technology at the time and I can imagine that if you had a CD…if you were a medical student…if you had a CD you'd be able to rotate the image and you might even be able to do a section of it and open it up and see the component that's inside. You might even be able to have annotations to say what they are, hilum that are on there so I can see that being the basis of a really useful interactive maybe. I just realised I'd said medical students…that that sort of things could be the basis for a medical student learning about the structure of the kidney which I suppose means it could also be used for a patient to be explained to what this red bit in the kidney is but I think some sort of interactivity might be…I would benefit from interactivity and that ability to ask it questions maybe through pressing a key on the computer or whatever but say if there was an opportunity say well open up the kidney to see what the internal structures…somehow that would happy.*

J *Do you think the text is quite an important thing Simon that some said that Gray's is the only one that has text that's that one…*

AT *Yes I think annotation is useful for somebody who's not got ability within them to explain but also as a reminder because I can imagine if you're having something explained to you, especially if there's a rather arcane vocabulary of jargon associated with it, it's unlikely that you can retain all*

*that information. Maybe the names that you come up against and therefore to have something that you can take away with you whether you're a student or a patient that would just remind you or even explain to you the words that the specialist used or the teacher used like the teacher, he or she might say "the hilum is an extremely important part of the kidney" and they then go on to something else and you think well what was the word that he said and then if you've got this book or you've got this CD or whatever you could back to it and say now which bits the hilum now which we've been talking about and it will become part of an educational process. It doesn't…just a kind of…*on particular moment* that is a sort of an ongoing iterative process that learning about, relearning about and forgetting and relearning and I think, within that process the annotation is very useful. In terms of a book its difficult because you can't have any interactivity but it would be relatively on a CD or something like that just to have you know to switch annotation on and off so that you could have that or even just to you know manage that sort of thing through annotation. Come up to say what a particular part is. So do you want me to talk amount the emotions.*

J Yes why don't we move onto emotion because that's really comprehensive that's good.

AT Emotionally that's the one that's most emotional (Image 1). That like obscene, vulnerable, personal, worrying, distressing, bilious you know it's the sort of thing if you look down it's like the catch 22 moment isn't it. You know there's that awful scene in the aero planes, some poor chap is blown apart and he takes his shirt off and you know if you took your shirt off and you saw that you would probably pass.

J It's almost like nature never intended for us to see these things. We're not programmed to deal with that world.

AT No. And so that one is by far the most emotional of any of the others on the wall I think even though it's not informative. I don't have a clue what it's showing except if it was my insides I would not be a happy chap, I would be very unhappy if I ever saw that view of myself it would be very distressing.

AT The one below I put down space age, science, visualization, like a school program illustrating blood flow almost…this is my instinctive reaction. Almost devoid of emotion but there informative, easy to understand explanatory, bifid, clear but then I put down drawing or relationship with the movie which I new something about so may be my instinctive response to that image is somewhat coloured by having Peter Stonebridge give me a little bit of an incline of what was going on but it's also very beautiful. It's beautifully crafted as image and very provocative and sensuous and you very pretty and…so if those count of emotions they come in as well but I think it's just a very attractive and informative of expressing things. I think that has to be why people like Carol Pope

lobbies when there's an event on or something like that. It's just beautiful.

AT The one on the top right, I can't get any emotion out of that at all. It's very bland.

AT The one underneath, I put down sclerotic disease, alien, sinister. So I found that image quite emotional. I found that one quite…a bit like alien or something like that. It does have an emotional power to it. I suspect that if it was…if some well-meaning medic, if I was ill, decided to show me that image of a bit of my inside and then new it was me and it looked like that, I would feel a little bid "Blurgh is that what my pancreas looks like" or whatever it is. Do actually know what it is?

J Yes. I mean that is your kidney. It's exactly the same as all these other images. It's just it's using the state of the art 3-D reconstruction software that's installed on all these multi-million pound scanners.

AT So why are the other three…oh is that a bit of…

AT That's the liver I think.

AT Ah that's a little bit of the liver that bit that obviously spreads across. And are they diseased kidneys.

JM Yes. Well it's funny because even though they look diseased and the image looks generally bad, that isn't the reason…I mean a healthy would look the same way, it's just the way that it renders it to help the radiologist differentiate between black and…but it is if you notice that see where the main sort of tree trunks come down, to the left and to the right there's just a little gap on each side. That's restricted flow. In fact, there's no flow in either of those kidneys. So this patient is going to have multiple organ failure.

AT Ah right. Now that's very interesting because now it does become very informative. They do look diseased, something to do with that blotchiness and the sort of not the sort of smooth exterior of the kidney that you expect to see in sort of these other images and yet…

J Does the tree trunk look unnatural to you, the main…you know…

AT Well that looks distorted to me as well.

J …because it's completely distorted it should be light a straight…almost like the line on those other ones but because of all the lacking of flow it's all pulling and causing bulges in the wall.

AT So that would be something that the specialist would explain to me as well that this is what I'm…it's just a little bit too raw for me. You know it

would be very helpful, it would be very informative to show me that the main blood vessels that feeding my kidneys or is receiving clean blood for my kidneys is distorted like this because of the disease. It would be very informative to show me that…where the actual breaks in the flow are but it's all within a sort of context of it being a little bit sort of too raw for me to try and find comfortable to see in that form but yes now that you've explained it to me I can see that it's extra-ordinarily vivid.

J *It's a diagnostic image though it's not designed…it's a bit like the MRI in that image there to the right of the middle board. It's just purely designed for a trained eye. You're right. I mean what you're saying is absolutely right but the rawness of it that is so true.*

AT *That's exactly it's problem but if that rawness could be slightly emulated, softened*

AT *If it could be just softened a bit, think that could be a very useful…you know I would like to see it as a patient. To see some of the things that I couldn't see otherwise because it would tell me…I can imagine somebody would sit and say to me you've got a break and there's no flow going to the tributary that goes out to your kidney and there's a break in it. I tried to imagine that in my mind. You know it's almost the opposite of the one up there where the idea of constriction, I can imagine what constriction means but, in terms of location and in terms of visuaslising it, I would almost feel happy to see that even if I was ill because you know I don't know how a widespread a feeling it is but when I've talked to people, people often feel that they can do. If you can visualise it you can feel you can actually affect it and having something that is as strongly visual as that I mean this is obviously accurate because is actual taken from real data. You could almost imagine yourself going back and lying in bed at night and thinking. Right I've got to focus on trying to open those blood vessels, you know trying to send the…whatever defense mechanism or whatever repair mechanisms you've got in your body down to those to see if they can do something about it and so it's a bit like wiggling your ears. You know they say that if you've got a mirror you can learn to wiggle your ears ten times faster because you get feedback in terms of…I mean if you're just trying to sit there are wiggle your ears you can do it after a while but seeing what you can do and you know it's an accurate image because it's real it's not visualization it's a sort of real image and it would be me rather than just a generic image of the problem but it's raw. Anyway, there's no emotion in there at all.*

AT *These again look in exactly the same category as the two in the bottom left there. Then you've now told me that's not actually an x-ray it's an MRI scan so that's radiography is it, radio-imaging.*

J *It's magnetic resonance so it's interesting the way magnetic resonance works. It works different from all the other types of scanning which tend to fire things at you, particles and they're all absorbed in different ways*

and they put a plate underneath you effectively and that's…whereas MRI is different. It basically, they put you in a magnet that something like twenty or thirty times to a thousand times the strength of the magnetic field of the planet so it's superconductive. Basically, it causes the wobble of the hydro atom that's circling, because we're all made of water pretty much so it agitates or sort of changes the axis of this hydro atom when you're magnetised and then it turned the magnet off and the relaxation of that atom as it turns is your resonance and each tissue has different relaxation levels.

AT So there's no dyes injected in the body or anything.

J Well, it's funny in this case there is. You can actually image kidneys or you can image most of the body without injecting dyes but to get the max out of it and to make it ultimately much more readable for the radiologists to look at they inject a small gallium of dye because it has a specific resonance that makes it glow whiter than normal so they can see where the blood flow is restricted in this case.

AT So can you see where the blood flow stops?

J Well on this one you can't because it isn't showing that it's just showing the location of the kidney. In actual fact, the kidney on the right is less healthy than the kidney on the left because there's less flow so you can see a slight decolouration because basically there's less blood getting to it because it's got less flow because it's got a restriction. That MR is the one that all there images are taken from so that one there that you described below the one with the light and the particle, the one there with the kind of hugh of red through it, that's a reconstruction of that kidney. You can see to the right, you can see the little pitting, can you see the little pitting just on the right and it doesn't look that round. It kind of looks like a bit of that has been lobbed off. Well that's because the flow is restricted and not reaching the circumference of the kidney. I can see that they're the same shape.

AT Yes.

AT And is that the same.

J No it's not. That's a different one in…it's the only one that's not born from that. That persons even sicker because they're getting blood to neither of those kidneys. So they're in big trouble because you can function with one kidney but not without two.

AT But presumably they could just repair the blood vessel.

J Yes they put in a stent. Graeme Houston, my other supervisor, he's an interventional radiologist so he reads these writes a report and then he'll advise intervention. They've got this little wire tool kit. They've all got different names but he'll insert that into a vessel in the leg and he'll feed

it up through your leg. You can see where it divides. That's where it divides at the groin. See the little V at the bottom. So he'll feed something up that into the aorta and then he'll feed something through into that and he'll try and pull the walls apart and he'll put in a bit of plastic or something to keep them apart.

AT An that's all done through keyhole rather than…

*J Well it's not…it's keyhole. It's just kind of non-invasive surgery but it's quite clever, what they do is they're looking at the radiograph image in real time so it's not MRI, this is back to x-rays but digital x-rays now so he'll be doing this, feeding it through and he'll have three sets of screens which he'll see in real time how he's feeding through. So when he gets to the point he'll stop and then he'll like deploy something and get it into the artery but he'll not be looking down, he'll be looking up. It's incredible to watch but it's really quite horrific if they get it wrong because the blood can squirt right out the artery when they're cutting into the leg and things so they all where **** and things because it can squirt out across the room apparently. I've only watched it through the glass. So that's what he'll do and hopefully that would fix the problem.*

J It's like the ultimate computer game that isn't it.

J It's unbelievable. It's incredible to watch. I mean inteventional radiography is getting more and more prevalent. It's going to be more common now than every because you don't need to cut someone open to do it and you're combining medical imaging, radiographical imaging with surgery, so you're bringing the two together whereas it's not like if you looked at a vascular surgeon he would just cut you open and go in and try and fix the problem and they often eyeball it. You what I mean rather than…whereas this is trying to combine.

AT The fact of what you've described – hand/eye co-ordination as well as the precision and care is phenomenal to be able to do something like that. To work on three sets screens to work out just precisely where the end of your probe is and all that is amazing.

AT I think it's very easy to perforate as well, the vessels because if they go too far they'll burst them and then that's it, that's curtains sometimes because blood would just spew out into the…

AT It doesn't bear thinking about.
J I just make pictures.

AT So again that one fits in with the other two, that's very attractive and informative. Emotionally, I didn't talk about the MRI scan. I think it puts a sort of veil over it. It puts into another world which is obviously the specialist world and if they can read it so much the better but like the traditional x-ray when you see…I think probably the last x-rays I saw where of my son some years ago when he broke his leg. Seeing his leg

fractured on the x-ray and thinking this is very curious what an x-ray shows you, it's like it's in a different world but it's obviously to do with exactly what's happened in the poor boy's leg and that MRI scan I think does the same sort of so emotionally it seems to sort of somehow displace the reality rather than bringing the reality nearer or making it more apparent like that one strangely does. The MRI seems to push it behind a veil to some sort of other place. It's quite curious that…

J *Do you think if it was you would reactive different to it or just because it's somebody else's. Do you think the emotional bond would be bigger if someone told you it was yours or…*

AT *Yes but I still think that sort of distance thing, the veil that falls down would still be there. In some ways yes I'd be more interested in it if it was me but it wouldn't be anywhere near as immediate to me as that one. It would be…it's almost like it's locating the tissue, the organ and the disease that's affecting it so almost locating all that in the world of the doctor not in my world. Whereas that seems to be bringing my problem into my world and making something more apparent to me whereas that one is the locust of these things, my kidneys, my disease is or I'm letting looking you through this veil…it's like the doctor or the radiologist or whatever is saying through the image I will let you look into this world which is where I live even though it's your kidney and your disease. But your kidney and your disease exists in my world but I'll let you look into it through this veil of the x-ray or the MRI scan. I'm not letting you completely into this world to see what's wrong with you, I'm only letting you stand outside and see through the glass darkly and that sort of thing…at what's happening. And as a specialist I understand everything that's going on here. You won't but I have to mediate it for you and I have to explain if for you so that sort of veil doesn't just alienate me it also protects the professional expertise and knowledge the person would have to explain it to me. Whereas that is much more upfront and seems to come straight to me and say…you know it's almost like my insides have put out on the table still throbbing and still there, still raw and therefore a little bit distressing but at least I can relate to immediately, it's almost like it's coming into my world. Whereas that one is sort of more of where the doctor lives, and a little bit of the world collapsed because of that because I think doctors are a bit sort of reluctant these days to hide behind their professional persona.*

J *Yes I think it's different. I sea change now. I think legislation is pushing that through as well because they're more accountable for their actions so they have to be informing people of what they're doing properly.*

AT *As I say I've got the blood flow in the same sort of category as…thinking about it now, I find those images very reassuring. May be it's slightly wrongly reassuring but they're no where…you know if they're displaying to me something that's wrong with me, in a way I wouldn't mind because they're so beautiful. You see what I mean. It's almost saying this is the*

beauty of the universe. It's like visualisation of the great asteroid that's floating through space and it's just going to come crashing into us we would still have Kubrick directing the movie and Yohan Strauss music going on the background. It's beautiful just looking through space.

J *So do you think in that way they have soul them? Do you think they maybe offer some sort of humanity to the image because they showed the beauty to do that?*

AT *Yes. I think they managed to create a beautiful image. I find the avoidance of emotion, you know which can be an emotion in its own rite is reassuring and professional and competent. It has an image of confidence and because it's so beautifully done. It was obviously done by somebody who knows what's happening and it's well informed and it's you know it would be silly if somebody who's doing those things, as I know you are, went into them and wanted somehow to emote through them or wanted to somehow convey the angst that somebody who is going through a disease is suffering and those that are polished so that this is beautiful imperial lighting and the delicate balance of colours. The black background and you know the…they all inspired and combined to create. A bit like a wonderful David Attenborough programme and where you can deal with death and predatoryship and all of those things without getting too affected by them because it's so beautifully photographed.*

J *That programme did you watch in Sunday. Did you watch the David Attenborough…*

AT *No this weekend no.*

J *It's just incredible. It's like watching the Sistine Chapel on a television programme. It's like the Sistine Chapel from the 21st century. It brings you closer the divide I think but I don't think people realise because they just see it as television but to me they are more involved in producing such beautiful images. It takes three years to make one episode. It's just…I mean they were in caves and they were looking at life in various caves around the planet in there ecosystem that exists. It was kind of like a digital baroack almost.*

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AT *I think they're on again on BBC 4 or something like that. So I'll try and catch it, I'd like to see them. But I think you've set yourself high…you know having produced those beautiful images, everytime you do something different now, you've got to match up to that because it's not just to do with the technique not just to do with the technology, it's also to do with being aesthetic and it's do with that balance between the emotional and the informative and it's to do with the not giving in too much to the emotional and therefore finding a delicate balance where it's supportive but informative at the same time.*

J *Yes I think that's the difficulty isn't it.*

*AT But them I don't find much emotional content in any of them before so I'm not that ***** to say that the emotion. I think that's there's a bit in the last one again of the same sort of things that's I've just been trying to stumble my way in regard to the blood flow ones. There still something about that beauty that is reassuring and almost reminds you that the eternal beauty of the universe, I know that sound a bit of a pretentious thing to sort of say but through that beauty, and it is a bit like with Kubrick things floating through space, through the beauty and the delicacy and the refinement. You just…are almost sort of metaphorically reminded that maybe the whole universe is beautiful and you know that the Nebula and the solar systems and the speed that we're moving through space and all those things are on one hand blindly terrifying but just because they are so beautiful you can cope with them. Again, you know it's just sort of struggling…you know but that comes into the same category as the beautiful that helps you cope with the daunting nature of things.*

J It's almost like the beauty holds your hand as you go through the functional.

AT Yes that's a good way of putting it.

J Okay what's next.

AT Well the last thing, the last topic is the total of the images but I think we've talked a little bit about that already, you know we've kind of described ones that king of function on both levels. The aesthetic and functional. I mean unless you want to add anything to the ones that you feel offer the most totality kind of encompassing both the aspects that we've talked about.

*J Though I think the only thing I might add is the…you know if we compare what I probably…I mean discounting *** and emotional the most powerful one which is the top left on the first board. The two, just because there next to each other there's the blood flow one and there's the total gap of the kidneys. You know both are extremely powerful but I think there's one thing about the blood flow one is that it's generic or I interpreted it as being generic where as there's an enormous amount of baggage and investment that you would put into an image if you new it was a view and that for me is a huge ****ive distinction, both emotionally and in terms of information about any image that might be trying to tell me something or help me with a disease that I've got. It's just generic, a general you know visualisation or a illustration of what's wrong with me. It's no where near as engaging though it would be informative*

AT This is an image of what exactly is happening inside me and so…

J Okay. Good well the one last thing…sorry because I know your conscious of time and you'll be wanting to shoot off soon…is to just put a

scale of 1-5 for the emotional and the intuitive. It's the top five of emotion so number 1 is the one you feel the most emotional, then number 2 is second, 3, 4 and 5.

AT *Rank order.*

J *Exactly rank order. And do the same with information and ***partment.*

AT *So you've got a number for each one.*

J *I've got images I can put them up if you want. I'll use…*

AT *Oh you want me to just stick them on.*

AT *So if I put number 1 that would be the most emotional.*

J *Can you spot the kidney…that's the kidney in that actually. Can you spot the staple as well.*

AT *My goodness a surgical staple.*

J *I think this is an operation to cut the blood supply to the kidney while they fix into that..That's a special gun that staples.*

AT *But there's something about the image that almost stops you looking at what it means.*

J *I think it's a natural response something that's hardwired into everyone that it's something causes instant fear when you see something like that, do you think.*

AT *So this is the emotional.*

AT *This is the emotional yes. I was supposed to do the informative first…do I have to do a fifth….*

J *No not necessarily.*

AT *Can I just stop at 4 for the emotional*

J *Yes. The blue one is for sort of intuitive or…*

AT *Informative.*

J *Yes informative.*

AT *Do you mean potentially informative or…*

J *I think based on your initial instinct before I've laid on the actual information.*

AT If I put it on this one, it's going to be to do with all those three.

J Yes stick them on them all because I'll record it.

AT And then that one I think is potentially very informative it really could but elaborated with extra information.

J Would you say that all the 2s. the video That would get 2 as well.

AT My only reason for putting that first is because that issue I was saying about it you know I would imagine that was actually me and therefore I would…if it could be ***** a little bit more palliative I think I would learn a hell of a lot about my disease ****** because it's mine it's about me and that would be important. Because it's mine and it's about me and ****I mean if my ****ation was supposed to **** *****.*

J That's perfect. That's great.

AT It's very interesting to gradually work your way into…what when you come in ear your eyes are caught by the bloody mess in the top corner but then you look at them all and you start to…I think the conversation with you it was very interesting to tease out more delicate nuances interpretation different images

J I suppose…I mean that's probably one of the arguments for this type of method for probing the images is dialogue is a useful mechanism to try and…it's a method in itself in dialogue to try and...

AT Oh yes the most useful rather than a questionnaire bring out subtle thing. Do you think you'd every get to the stage where you would go through it with somebody who's ill, who's go the disease that you're actually displaying.

J Yes I think so. Yes I think that would be an important thing to do. I mean we would have to tailor it…we could maybe incorporate an image of their body into to it to see how they react and how they bond with it. We would need to watch ethically because we'd need to…

AT I suppose it's a bit like six boys who have the drug injected into them and so forth. It's best to try out all these things out first on people who don't haven't got emotional investment in it first to gauge whether for example if you did show the image to whose insides it was you know are they emotionally strong enough to cope with seeing some of these things.

J Especially as well with using some of the gory images as well. I mean the likes of…a bit kind of romanticising this but it would be nice to try and kind of look at the beauty of the aesthetic could just completely numb people you know and hold their hand and drag them through a very

complicated illness and actually showing somebody even though it might be a bad thing, using beauty to show…

AT *I think my reaction to that is that that's quite humane, it's quite refined and polite and civilised and that yes there are people who might be a bit more sort of severe about it and say you've got to show them what it's like exactly. You've got to show them exactly what it's like and how horrible but it's a bit like manners, it's a bit like blindness and delicacy and your images are very polite and I think they're better for that and I don't' see the way that the beauty hold the hand of the person that's struggling to understand things that are threatening their lives. I don't see that as a bad thing. I think there is a misplaced sort of roughness to saying right tight you gotta see warts and all it's horrible and it's going to kill you and all that sort of politeness that your images have in saying. That's a nice phrase that you use the beauty of holding your hand and you'd be happier if you, you wouldn't be all that happy but if you were dying and there's this beautiful nurse who tended to you through it, you could do it but you'd still be pissed that you were dying. Just helpful isn't it. There's a wonderful phrase in a book by…have you ever read about The Leopard by Guiseppi De Lambadusa. He wrote a great book. It's about Sicily in the 19th Century which doesn't sound very pre-possessing but **** was dying of cancer. It's just about the only real book that he wrote and he was dying of cancer when he was writing it and there is an expression that stuck in my mind. It describes death as being like a beautiful ****** it's like being in London but it's like a beautiful woman dressed in a brown suede suit and that image of the beauty, the sexuality, femininity and you know he was a man who was actually dying and I don't know whether I can find the passage for you but it's on a station, a woman, the brown suede suit and she's obviously rather beautiful. So I think there's something very delicate and very refined and very you know something decorous polite and beautiful about all that but I know people would say a load of crap old world. That's another interesting thing about why the image of David Attenborough springs into mind as well because he's a sort of old world BBC type isn't he. He does introduce predatoration and death and animals eating each other but he can do it through that BBC blight, beautiful way of doing things.*

J *It's funny though it's a really interesting point because it's almost like you could go to a…you know a radiological department and they will go and look and they will look at great white sharks off the coast of Africa and they'll count them, tag them, they'll analyse them and write a paper. David Attenborogh will make a television programme that will last 10 minutes, 20 minutes, half an hour an hour and they'll spend an equal amount of time researching, preparing and filming and sitting in a boat for weeks and weeks getting shots and they will not present the work not in a paper but a television programme to the masses that will give an insight into the soul of the great white. You know what I mean and I would like to think that my works, you know I'm not counting, I'm not quantifying, I'm not logically analysing scan data and how people. I'm trying to look at the wholeness and the soul of it. Rather than presenting*

the imagery a bit like they do. The programme I saw was incredible they had a shark coming ten feet out of the water, a great white shark as long as a London bus and it ways much the same and it was ten feet out of the water with a seal in it's mouth. And the way that the camera angle, the photographer caught that…you got the anger, you got the way nature…the ruthless of nature but the complexity and the amount of evolution required it took for it to get to that proficiency of killing and to be able to do that is incredible and so you get all that in three or four seconds of footage.

AT *Which you would never get from reading 100 scientific things.*

J *And I think may that's what I'm trying to do with my work. Is trying to…I mean I know it's important to try and inform patient's and to do that but and that's part of it but it's **** it's trying to smash it into this sort of aesthetic appreciation and maybe like you say politely interweave of it, I don't know.*

AT *I think the manners bit is quite important. That somehow…it's very clear that it's a little bit rude. It's like to fingers up to you.*

J *I mean that's almost pornographic in some ways, there's two of them.*

AT *I mean there's two of them. That's what I've put down.*

J *Whereas this is more seduction and they're showing much the same thing. One thing with this one as well is that your in the vessel but you only see a very small part of it but your brain and you know that's there's probably more particles here. It's interesting I have to go over these images for an hour and talk to about the*

AT *This one.*

AT *That's me.*

AT *Did you just do it with your tongue in your cheek or did you…*

J *I was basically trying to explore this kind of line drawer and take the absolute basic of imagery so you take the absolute basic of the line, which is the silhouette that other one on the bottom left just to highlight the areas that you're presenting completely raw information.*

AT *It becomes to simplistic.*

J *It doesn't have any aesthetic **** ****. The interesting thing is if you then represent that *** if you then represent that information as an animation because this is a contouring technique of 3-D animation *** that's actually a 3-D object and if you *** off the page, it constantly rotates the silhouette but it recalculates it frame by frame so you get this really strange effect which is actually really nice but it doesn't work because it's*

*still. As a moving because you end up with lots of these little red, ***** as they move they rotate. So It's really nice and really aesthetic.*

AT *Are they moving because you are rotating the image?*

J *They're actually animated so everytime you move the computer recalculates then they move again and the you're looking at it as if you were looking at it in profile.*

AT *Do you need any more.*

J *No that's stacks.*

J *We've talked for an hour.*

AT *Enjoyable and interesting would you like the notes.*

J *Keep them as a record of the day. I really appreciate your time it's been really…*

1.6. Fine Artist S & R

Date: 30/3/06
Duration: 1:08:14

FAS: Is the point of this in creating the dialogue for the patient's or is it about…

J No it's nothing to do with the patient's so this is just purely like probing the work for it's other components like this is trying to just get a feel for the non-clinical environment and how people navigate through the images in a completely different context with a different agenda altogether so it's less about trying to communicate the sort of the disease process this is potentially more about trying to just probe how people judge the image on instinct and on you know it's kind of aesthetic content but…

FAS I suppose at the back of mind, who's the imagery for, who's the audience for this because it's that criteria that making me think is it successful or not.

J Right. Right. Right. I think in some ways I think the images that have been presented today are not really…they kind of have a dual function because in some of them you wouldn't really show them to a patient I don't because they don't really give an obvious explanation of disease but I think there is another exchange going on there that's more of a visual exchange that's to do with their emotions and how you know the colours and shaped and forms and how they navigate to that. Do you know what I mean? It's more just to sort of just to test the waters with a different audience all together but you're right I mean it's a fair point obviously it's difficult to judge emotion if you don't know who these are targeted at but just to try and get a feel for what your instincts when you look at the image. For instance, you know the photograph, how do you feel when you look at the photograph? The one on the top left, or how do you feel when you look at the more of the scan type of image just to get a kind of key working coming into your head and you navigate around it and just the emotional or just like intuitive logic like you know the structure reminded you of something, the shapes, the composition makes you feel a certain way. Does that make sense?

FAS: It does but I think in a way I've been thinking the wrong way about it then because I was thinking more about…I was thinking about the specialisms of medicine and when your exposed to that thinking about this imagery in you trying communicate to various…say a patient of some sort not…I been thinking of them when you left us as more in those terms than a kind of gut reaction to that baggage.

J Yes but I mean it doesn't really matter I mean I'm just…I mean I'm only interviewing five people and it's just to get a feel for…maybe that's something I should think about for the next one I do is that people are going to come in with that baggage so how do you stop people from trying to put themselves in the patient's position because obviously instantly you see medical, maybe people adopt that kind of what if I was a patient and that was a bit of me. But it's also trying to look at truths as well. It was sort of like scientific truth that you must be…sort of like explain the kind of what is there? It's so important that you replicate the reality of what is there but you know my feeling is that isn't the only truth that is available when you filled in the image commentary. There is another aesthetic truth, it's like emotion you know in the detail of universe you know what I mean, it isn't driven by just replicating the reality of the situation.

FAS: No I absolutely agree.

J So it's those sorts of things I'm maybe trying to tease out a little bit from people who feel like yourselves who are kind of not really driven by the technology but driven by you know the kind of arts, you know what I mean. I mean maybe if we started with each of the images and then just go through them and maybe I could just talk out how you felt. I mean is there any particular image that you felt that you wanted to start with and talk about or…from the sort of…maybe more the intuitive or you know start with the ones that you were most emotive of.

FAS: I mean there is one I would start with. I would probably start with that kind of etchy-type there because I think for me that…again it's…I'm coming within a baggage that you come with but I'm thinking for me that represents this kind of knowledge from mind who has looked at an object like a kidney and has been able to see kind of pools and boundaries within it that to an untrained eye they wouldn't know and so it's speaks of an understanding of the organ but I can see that's it's simplified down and there's like…lot's of editing has taken place so you know albeit it looks like an old image. It looks…

FAR: Like from it's from like a type of journal or something.

J It's a Gray's Anatomy, it's from Gray's like 150-year-old anatomy.

FAR: Of that era.

FAS: But it's quite effective that..

FAR: Explanation type imagery about it.

J Yes it's of that kind of engineering you know Brunel you know map making engineering you know Victorian mind set and aesthetic as well and, I don't know what you think but I think it tries to have an absolute truth but in some ways it's very ornate you know I mean when they build

it they probably thought it was a very pure representation but it's everything but that.

FAR: Yes.

J Its edited is interpreted its handmade.

FAR: Well if you sliced a pine cone through the middle you could do almost the same type of drawing but yet the two surfaces are completely different aren't they. Although the materials are completely different I mean you end up with a kind of illustrative drawing similar to that because it is that intervening structure. It's more an engineering structure and mechanical.

J Do you think that it has any emotional content or is it just pure like part of the structure?

FAS: I think it does. I mean I think it's quite aestheticised. You know I like thinking about how…

FAR: Is that emotional?

FAS: Well I mean it's also quite almost interesting…

FAR: From my own point of view it's quite of interesting but…

FAS: It's interesting you used the word map mapping because it seems you know it's almost like it's moving to different territories and there's boundaries so you can imagine…I think I was about to say emotion but it's more than just perfunctory I think and there has…it's more than just engineering you know it seems to have…and I suppose it's kind of conveying to a centre extent light as well with that light area in the middle in that at least it makes it feel moist and wet or…it's more than just you know a straightforward engineering realm.

FAR: The other thing about it is because it's kind of old-fashioned, I would imagine it kind of makes you think about that period of time so therefore you're not thinking about all the developments since that period in time and I would imagine to engage with a modern audience or even a female patient you want to be reassured that wherever you are or whoever was shot in these imageries is up in contemporary developments and who really knows what they're doing so in a way it kind of…it's kind of nostalgic in that way isn't it.

J Do you think it's human…it's more humanized, it's got soul because it's been handcrafted or where obvious the other ones are a much…have a different feel to them?

FAS: Well I suppose I did more so on this one, you know the black and white one there.

At the end.

FAS: The third one. Although if you think about you know to my eye it's quite hard to relate the two other than their kind of outer periphery in these kind of like quite different structures.

J Yes.

FAR: It's got a wee bit of soul.

FAS: The Gray's Anatomy one. I think it's got a lot of soul.

FAR: Whether that makes soul.

J I mean it's as well as, there's this definition of an emotion you know what would you describe when you look at an image and you know I've been asking people what they think about you which one is the most emotive and causes the most emotion and then just asking people what they define as emotion you know is it a negative thing, a positive thing or is it just a general instantaneous reaction that attracts you and repels you from something. I suppose it's a difficult question t answer.

FAS: It's difficult because you're not quite sure what…I find it hard to kind of steal myself from the point of view of thinking as a patient or as owner of the kidney or you know so it's quite hard not to be objective you know and…

FAR: On the subject matter almost has baggage with it doesn't it. It always has a context and you associate with the subject matter and especially with you recently with you recently you know getting that CT scan.

FAS: I know we've just talked about that. Both of us have had recent contact with the medical profession and so maybe that's why it has a lot of baggage just now.

FAR: Because I lost a lot of blood and I was…so I had had what had happened to me and I was looking at this and I'm thinking I don't have enough these wee cells just now you know because it's mostly just water isn't it.

J I'm not really sure to be honest.

FAR: The stuff that carries them so what I've had with loosing the blood is they put water back in but I'd only made up on the cells so it was quite interesting looking at this and them I'm thinking is that about the right amount of cells with that relationship to the water there or should there be a lot more. So I was quite curious about that. So we're bringing our…and your CT scan…so we've been bringing these kind of…

FAS: I suppose another thing and this is moving away from the question but the other thing was I was watching this program endorphins and how human bodies have got the ability to heal themselves through believing in things and it goes back to kind of shamanism and participating in a virtue that if you believe and you invest in it these things can help you. But this contemporary doctor was saying that going in to have a CT scan done you are enacting in this ritual you know that you're in a theatre, you're in a big…and just you know so sometimes just being part of that where nothing has happened to you, nothing physical has changed but it raises your endorphins or it gives you knowledge. In my instance, it gave me knowledge that there wasn't anything there causing these headaches so and the headaches are subsiding so a lot it was in my own worry but they also with Matthew when he got dismissed from hospital there was very little information and so there is this kind of period of confusion in not knowing so I suppose I'm looking at these from the point of view of the information helps you to feel differently about your own physicality and the other thing that's important in this image for me is having worked recently with a botanist whose quite a kind of bald retired guy, it's beautiful poetically of describing structures and I really kind of value the emotion that he brings to describing these structures. So you know I suppose I'm kind of…

FAR: There's a lot of botanical drawings are like that aren't they. We're working on this project trying to illustrate plants and things but we're trying to do it a completely new way with high definition video and kind of telescope motors and all that so we're trying to get away from this type of representation of the botanical specimen which comes from round about that time of era and has influenced all botanical drawings since that era. It's quite botanical. The other thing that's affected me a lot is we're having children watching these kind of contemporary films, you know some of the images have got a space age kind of thing. You know like I suppose it's the dark background in deep space and then you've got these kind of creatures or structures within deep space which is quite different you know and quite clean you know if you look at the gory one you instantly recognise that as some kind of organic thing that's a slice of. When you're seeing into it, it's very gory and it's very bloody. The one underneath it is very plain, it's quite pleasant to look at. I would imaging it explains the mechanism of movement and pulse also it kind of shows that kind of constriction in the tube so it's got a kind of…but it's very pleasant to look at and it makes you think of contemporary science and contemporary medicine. It has all these quite high tech capabilities about it. The top one doesn't explain anything and it's just pretty unpleasant to look and you know you wouldn't you're better not looking at it at all.

FAS: I suppose it gives a sense of panic the top one. You know it's out of control and it seems. There is no mechanism, there's no system to it and…

J Due you think it's broken a taboo that maybe we haven't something inherited to us that we're not really supposed to see inside our own bodies. We're not supposed to be exposed to that kind of…

J: We are cut off from that everything seems sanitised a bit doesn't it.

FAS: Well you see probably not a…it's not a taboo to the doctor who opens that up and discovers it and these white lumps are meaningful to him and the bloods neither here nor there because that's just what floats around and that blood probably needs to be there to feed that organism so it's all…it could be absolutely tickety-boo as far as a doctor goes but I suppose from a lay person's point it makes no sense to me so there it's like horrific because I don't know what that means. As a patient I would want to be told that. I would imaging I would want to more about what the system is meant to be like and that…so I suppose all these refinements are more like how a knowledgeable mind would look at it because they already see the definitions and the boundaries and the systems that are there but to the untrained eye those boundaries need to be made more clear to me to make me see what a doctor's looking a more gory thing. I would imagine that's kind of the point to it I mean I have lots I'm interested in but that top one seems to be more of a kind of artistic explanation. It doesn't…it doesn't seem to be offering you particularly a kind of insight into the thing so maybe you know I'm not quite sure what…it just seems to more of a graphic thing which might have a role somewhere else but…

J Do you think it probably lacks, doesn't have any emotional bond and very little kind of explanation to it.

FAR: It's in a technical content but…

FAS: It seems to be referring to something quite technical and it's looking at the isolated kidney but it doesn't really seem to have much purpose in the way that the other ones might.

FAR: It's kind of in between because that one there's got a lot of construction about it, a lot of information. This one's quite beautiful, aesthetic the bottom left and that right one sits in between it's either giving me a lot of information and it's still aesthetically interesting.

FAS: I suppose the one below too doesn't really give you more information but it feels more real somehow so when the information like you can't seem to make sense you kind it expect not to because it almost seems like it stems from something quite real.

FAR: You're more curious wondering what it is. It's got a curiosity part to it doesn't it.

J I mean that one's taken from a…that's actually taken from an MRI scan,. It's the type of imagery that would come off the scanner.

FAS: Which one the lower one.

M: What's it of?

J It's of the same part of the body of the rest of them, two kidneys, the aorta up and down the middle.

FAS: And what's that other thing circling that there.

J I think it's the liver because the liver kind of overlaps one of the kidneys.

FAR: Is it. Again, it's nothing like reality.

J No it's a representation so.

FAR: It looks like some kind of building material or something doesn't it.

J Do you think the centre of it, the kind of tree trunky bit looks natural or do think it looks unhealthy or you and aesthetically does look…you know the middle bit.

FAS: It doesn't look amazingly healthy but I don't know whether it looks…

FAR: Your were intrigued how the tubes were joining up in the centre bit.

J If you notice on each side of the tree trunks those little tubes that come off there's like a little gap, you see on each side there's like a little space between each one and that is basically bad news because that means that there's no blood feeding through properly to the kidneys because there is a blockage, there is a narrowing so this is not good this one and that's part of the reason why the whole tree trunk has become distorted and bulged because the blood flow is just not working right and the whole thing starts to break down whereas if you look as some of the other ones it's very much, there's not any bulges, there's kind of straight tube.

FAR: Without kind of knowing exactly what it should be like you would've known that. You would eventually spot those gaps though you know.

*FAS: Well though that might have been to do with the tube twisting behind itself and whatever that mechanism was that read it doesn't read that. But compared to how sick that tube looks coming out of the kidney in the Gray's Anatomy one, it really does look *sick*.*

FAR: When you were out it would be incredible to see a TV programme using that type of imagery, the whole body you know…

J This one here at the bottom left.

FAR: The bottom left because you could really look at it and get into it and find it amazingly intriguing because I mean we know very little about our bodies really and I think it's because of how it's been represented in the past. First of all you don't want to look at it because kind of the top image it's gory and also it becomes too mechanical and not aesthetically interesting enough to spend time with but that type of representation you could take lots of different subjects, this is how this…the one with the brain you know like blood flow is an amazing thing. You would imagine there would be a big audience who would not only enjoy it aesthetically but then they would learn a little bit about how they actually work and then think it's not gory.

J It's a good point actually because something that came in yesterday was…the discussion was that does the aesthetic hold your hand through the function you know this sort of imagery. Can it really relate? Does the aesthetic some sort of lightness and comfort before you then go into the horror or the wonder of the function. It's almost like acting as a translator or a way of bringing you closer to the truth but not presenting you with the truth. I don't know if that makes sense.

FAR: I think it does. I think that's a nice way of saying that you've got this kind of you know this…it's hard to say it better that isn't it because it kind of makes you want to understand how it works and you're not horrified by it so you're quite willing to learn and be intrigued by the wonder of it all and you know and I think that's what's been putting an awful lot of people off you know caused in the type of imagery.

FAS: Since you've been working on this project has it made you change anything about the way that you liver in terms of being more aware of the health of your body.

J I don't know. It's difficult for me to kind of pull myself away from the work and sort of like overall…I mean what's it's done is it's brought me closer to the wonder of nature rather than…I mean I think I've looked at science and looked at the body of, very much a reductionist pradigmn you that the body is the ownership of science and not the ownership of the person. It's not owned by the person and the wonder of it is exploited through this kind of like…I mean the penny dropped actually last week. I don't know if you watched David Attenborough, and it's absolutely incredible. I mean there was a shot when they were in South Africa with great whites preying on seals of the coast of the Cape of South Africa and one of them was shot that must have taken a month to achieve and with the shark going about 10 foot out of the water. This shark which is as heavy as a double-decker bus and as long as a London double-decker bus and it was 10 foot out of the water with a seal in it's mouth and they caught it and the photographed it and filmed it. Incredible from the side of this boat and in a plane and you understood more about the mechanics of nature the kind of like the prey versus the predator the ruthlessness of it but the beauty of evolution just in that one shot you could read so much and I just thought you know there could be

like a…you could send a boat of scientists out from Oxford who would two or three years analyzing the behaviour of the great white shark. They would write papers, they would document some of the beauty of it but they could never capture what that artist captured in that photograph and he probably spent two years in South Africa. You know the production times of these documentaries is enormous and it's two very different ways of trying to describe the wonder of nature and that's what I thinkstart

FAR: I read a book recently by R N Nas have your heard of him. He kind of poined the phrase 'deep ecology' and there's a lovely kind of chapter in it about science and he was kind of saying science is kind of in a way a reductionist thing because he was saying it has to be kind of universal therefore he gave the example of a flower. Scientist looking at a flower has to find universal things in it that any scientist in the world can identify with and replicate you know therefore you can measure that this is the height of it and that measurement would be every part of the flower, this is the width of it, this is the weight of it and this is the mechanics of it and then he said once you get into things like what colour is it, how does it smell, what does it smell off, what's it's symbolism, what's it's kind of metaphors to society? He was saying scientists cannot handle any of this stuff but he was saying what is a flower? It's not about the height and all that it is about all this other stuff…

The totality and the harmony of it.

FAR: It's a brilliant chapter in how you can't just like the science because it's a reductionist thing because this universality of it, in principal it has to be reductionist because loads of these things are subjective and are all about our relationships to things and so a wonder chapter and…

FAS: It's maybe not that scientists can't handle it…

FAR: Scientist they don't claim to be. It's the public that think scientists are god and there not.

*FAS: Where only making the black and white characters who not really interested in this **** but I'm sure you've met guys on the course doing this that are brilliant and poetic about describing things and are brilliant communicators and orators of their profession but it's maybe that there isn't a portal for them to be emotional and to have this other way of describing the smell and the colour.*

FAR: The other thing that NAS was saying that society is fragmentary, you'll have your scientists and have your artists there and you'll have all your specialists who work away but he was saying kind of the worlds not like that the world is quite generalist and if you look at species and things like that they all kind of work together and feed off one another. Exactly the Attenborough thin, you know hear you've got the prey and the predatory and see the context and the sky and the weather and all these

things combined to make the seals in that particular spot at the time it was there probably feeding on something else so you've got this complex fatality that brings that there and the Attenborough crew and all that they've got to tune into all that to be in that spot. They've got to know…

FAS: *You see in a way I think that's why I'm attracted to the Gray's Anatomy image because I think in a way that represents a time when science could be that world. You could be composing a piano piece and be the author of this drawing because Ewan was talking about, the botanist we were with, he was talking about this amazing Russian botanist who made this breakthrough discovery in photosynthesis but he's actually more known for some symphony he wrote in such and such years, thinking bloody hell, there were these real renaissance factors. You know they were making this cutting edge…doing compositions, and he had an interests in like flights but he could be this every man whereas what your describing as where we are now is ultra-specialist. Your point is…*

FAR: *I think everybody's reflecting on that ultra-specialism and then thinking. A mean that's what going on at Dundee University you're saying they want crossovers and collaborations and you know may be this ultra-specialism. It's getting interesting with working on another subject with Jonathan Wares who's specialism is stomato how a plant varies but all he does is write these papers. It's like you're saying they were colourful kind of illustration nobody interested in fact the whole botany department has closed down because nobody was really interested in it. I mean you get the *big paper* who would be interested in this. But he's quite interested in what we're doing because we're using high definitions cameras and animators and everybody to now do what he was doing and maybe if he was collaborating artist years ago that department would still be there because then all that information like you're doing, the public interested, other people are interested, the governments interested. You know you're opening it up to this bigger field of people who can have access to the work and start to get interested in the stuff and then they value it and stake in it. And that's why the aesthetics is absolutely crucial isn't it.*

J: *I mean it's probably something that's penetrable you know like the MRI scan you know it's completely probably impenetrable to the non-trained eye although can make at least anatomy but then the interpretation process makes it more accessible and I suppose it's a sliding scale of a spectrum of how you interpret and whether you turn up the structure. I mean this is kind of what it was keen to talk about as well. It's just can you enhance the structure and the aesthetic at the same time using part information but we also used the aesthetic as well to help them increase the efficiency of that department you know what I mean because if you had given it…if someone you know…if science was left to analyse my project, they wouldn't analyse it the way I'm trying to analyse it and it's hopeless, they would try and break it up into it's colour, into it's shape,*

into it's composition and that would destroy the very nature of it's beauty because you have to start taking it down that path you this kind of cognitive psychology path you know what I mean rather than analysing it as a whole and often…it's hard as well for people like me as well because there's not many methods to try and like analyse your work. You know there's not many tools that are available. You could go to the sciences and look at their tools. They get people to tick boxes and do questionnaires and the social science are their equivalent which are a bit more complex because they're dealing with human beings, they are taking a complex approach. But again, they are quite restricted as well you know interviews, questionnaires, and is it really reflecting the totality of the work in context and comparing it against other things. I mean in terms of the images in this end of the room. We haven't really talked about them do you feel any of them…

M: The one in the top right.

J:The sort of line contour drawing.

FAR:I mean in a way it's quite a…I'm quite attracted to that one because unlike this one I think it's graphically quite pleasing and also it's instructive you know with the little circle you do see there is a kind of restriction there that's sort of tropical and also just from an aesthetic point of view its nice. I suppose it's complementary to the one on the top left so you know they're quite complementary to each other aren't they. You know you see the shape of the blood vessel and you get the feel of the kind of cave or tunnel or truth. Did you see the Attenborough one when they were caving

J: They were on that big mound of bat poo..

FAR:It's astonishing but I was saying to Louise, it would be interesting to use this technique to do a whole thing with the body. Like we were saying these inner landscapes and you know the kind of attach of cancers and all these kind of things. It's an amazing thing to do but you know on the tele and stuff you could do a whole series of it could you it would be fantastic.

J We're quite interested in this kind of cycle of life though the whole process that your body goes through every time it pumps blood round is incredible. The whole way it's regulated, the way it works, how you know when you die everything goes this kind of like horrible beigy colour a bit like the kidney on the bottom right you know the only reason we are where we are is because we are full of blood you know it's the kind of like blood that feeds everything and in it's absence we cease just to become an empty vessel. You know but it's like the caring thing if you were to explore different parts of the body…I mean that one what if you were sitting on wall of the aorta watching all this stuff go past like traffic. You know what I mean and this huge cavernous space. I mean the aorta is enormous it's like the motorway in your chest and if you have an

aneurysm or you something happens to you where it burst or it's blocked it's curtains pretty much because
it's like without it you can't…because the big tube that comes out your heart and forces blood all through the rest of the body and…

FAR: So where does the blood does it just sit there once you've like..

J: I don't know Matthew it's a good question

FAR: …because it's still in there isn't it but you know does congeal or what happens.

*FAS: John it's interesting as you're sitting there talking and I'm sitting ***** again. Is it what you're describing. You're kind of storytelling them…in quite a folklore. It's like a metaphorical way you're talking about this life blood that keeps pumping around us that without it we're this you know and in a way I almost…these images help your words as visual as the images in describing the story of the blood circulation and this is what this writer David Abraham talks about a lot is how well can we respond to storytelling and to imagine things like this and that they can makes these kind of leaps of understanding if they're given the information here and mythical story or if there is a big tradition. He's written really beautifully this you know the place of magic within the medicine or within science and things like that*

FAR I suppose you could almost have replaced that word "magic" by wonder because magic's got all kind of connotations to it that it's kind of like…

FAS: Metaphors is a better word when you can find. You're not speaking science speak but your using a story to communicate and describe form and function.

FAR: I mean one of the things Abraham's and various other of these books we've been reading recently they were kind of sending me…human beings, through the loss of storytelling and imagining, have lost this connection to the wonder of the earth, the wonder of our body or whatever you know and they were saying this is absolutely fundamentally dangerous when this occurs because you become…one of them describes it is almost as a parasitical species that comes down here and it preys on everything, it destroys everything you know just to kind of feed itself and this kind of feeling hungry and then we also become cut off from using our senses so we've become like drug addicts for gadgets and things. We don't make them ourselves so we don't have the enjoyment of making it. We don't have the satisfaction through the making that kind of central experience and also the satisfaction of completion. So like they made another one and then they made another one and these things have kind of…and we're all at it you know we're all parts of the addicts…talking about all this stuff and it's the same with the body we've handed that over to the specialists because representation is a bit gory and things. We need to reclaim that back.

FAS: You need such specialist knowledge, that's just your kidney and then there's your spleen and your liver and so you just.

J It's funny the whole language and the whole process is almost seeing it as a system like breaking it down into like subsystems and systems and systems and you know the whole word system is like wrong. It depends on your religious prospective but you know we're more than…some of them you know the parts you know what I mean I would like to believe there's more than just the mechanics of blood flow and you know that process but yet science is keeping it just kind of break that mystique down and just say no we we're cells that divide and evolved and we've evolved…you know no-one's disputing evolution…

FAR: Because all the other stuff is subjective. It's like the guy was saying you can start calling it colour and smells and symbolisms because scientists can't deal with any of that stuff so it does have that reductionist thing in the systems mechanics and that's how it kind of works.

*FAS: But the problem with the specialist they could smell sort of chemicals and things but they might not know you know the pollination people or the **** people…*

J The interesting thing that I spoke to earlier about, the guy whose a pianist and you know those people…I think we had one of those welcome talk things that say they may troll through systems and they do all their experiments and doctors go into the hospitals and treat patient's but yet they go home to their families you know and their like china dolls, you know they don't see the image systems, they see them as the ones that they care about and they're important in their lives and so this there is this kind of like contradiction that goes on in the way the whole structure of our society is fundamentally flawed in some ways then isn't it.

FAR: I was thinking how many people got killed on those buses in London…

J Oh the blow up of the tube…

FAR: Thirty or something. There was thirty people killed there, it goes on for weeks and it's a national crisis and all that. There's fifth or sixty getting killed every day in Iraq and we don't bat an eyelid, everyday. You know it's kind of like Abraham's is really good as well. You were saying that although we've lost these abilities it's not to say we can't get them back. You say for instance, we kind of, what was that…the IRA guy used…he kind of dehumanized things…animals are out there for our exploitation but if you put a bell round one of their necks in the farm and started calling it Daisy, you can't suddenly go out there and butcher and eat it because it's now Daisy. You've kind of invested in it emotionally or the way we chop down trees and stuff. If somebody came into your garden

and chopped down a tree that's been there for twenty years you would go absolutely ape shit because that tree it's like Abraham's said that's how we used to treat the world we invested them. We valued our stories and history now we kind of dehumanise things in order to do it…

*FAS: …was that type of experience that NAS talking about because you know he goes and lives up in a mountain hut and he has this fundamental experience of knowing about him and that majorly shifts his perceptions of how he looks at life and you know how **when he** goes to shoot the wolf, the gamesman turns from being the gamesman to the conservationist because of this encounter with the wolf that looks him in the eye and he recognises this is really the predator this is part of this complex system but both examples where these kind of fundamental deep experiences that you have in your life that can shift your perception and maybe that's what this imagery offers or at it's absolute highest it could do this is offer this way of looking at the body and your surroundings differently. Because the scenario you're describing gives techno freaks overall from isolate from real reality but that's part of who we are as a society now you so we have to kind of find ways….*

J It's bringing the wonder back into it though. I watched one of these programmes…you know the guy that goes around What the Victorians did for us you know the guy that does the tax ads now and stuff he's an old chap with glasses. What the Romans did for us and the Chinese as well, fireworks…I think it was one morning I'd slept in and I was just having my breakfast and I was watching it because it was on Channel 4. He went back to look at the microscope, the development of the microscope and what fueled the development of the microscope and he only went as far back as to the I think was like the 16 or 1700s on. It was developed by an optician in Holland who developed the microscope. But interestingly enough, this is all part of the philosophy of modern science and the way thing's were developing at that point and accelerating that their belief was that through the wonderment of nature it would bring them closer to the ultimate being you know God…they would become closer to God through the process of understanding the wonder of nature. So this striving towards nature had a kind of like a religious zeal to it, it wasn't driven by commerce necessarily at that point it was driven by religious zeal which was rife in Europe at that point with puritanical, post-reformation anyway so there's a sort of catalyst to that but I was just reading around this area because it got me thinking because I was looking at the work of Vermeer and Vermeer's will was actioned by the guy that invented the microscope and Vermeer was reputed to use camera obscura in his work and used lenses in his work. And so Vermeer was trying to describe the wonder of light and a lot of this stuff and obviously there's religion tied into it as well. But he was using technology and this kind of like…the threads of art and the threads of science were completely interlinked as well as religion functioning round about it and it's almost like they've all been torn apart, they've completely been segregated and no longer shall they mix because they're like oil and water.

FAR: There getting driven by a huge ideology. Everything's driven by international capitalism in a way to keep the flow of money, to keep the flow of capitalism and that's the resendentra for everything. So that's where NAS book is totally radical. He's saying if you want to survive the planet you have to be driven by completely different ideology. All this is just tinkering. You see Margaret Beckett on the tele the other night trying to defend carbon emissions. No matter what they do they can't because growth is called for, everybody's brought into this. And you're thinking this is just a waste of time and this is where R & N Nas's book is saying, he's saying we have to change dramatically we have to be driven by a completely different ideology that this is the environment we live in we have to find ways of living within it. International capitalism, we've had it and so far it's old fashioned, that's the past. We have to have new ways of working science possibly and you know knowledge and make it all to us living in a more harmonious thing on the planet.

J Have you been to any of Daniel's talks, three of his students and he's really interesting. He's kind of this realistic approach that Seaton has to design and he's very much at odds of the faculty of educating the students in terms of…particularly design his whole evangelical the way he talks. His thesis is like 300,000 words, it's like two versions of the phone book like stacked on top of the other, it's incredible.

FAR: What was the subject

J Its looking at the role of design and holistic approach and how design affects the planet so obviously we produce products that need manufactured and are often non-sustainable and we constantly feed the system but I think he's linking towards this kind of global climate change and he's talks about some of the thinking towards global climate change and we've all bought into the system that we have to…

FAR: We're all addicts and addicts need help to become not addicts. We can't do it ourselves.

J Absolutely but his idea was like building education communities to try and combat this but it's a constantly moving target and you can't really set in stone something, you have to constantly evolve to deal with these problems and changes training the system isn't the way to solve the problem your just feeding more fuel, you're building more designers that produce more products that feed the system whereas you need to build educational networks to try and think out with that process. I'm not doing it justice it was only a 15minute talk.

FAR: The problem is though the whole university is run by the other system, that is all about getting money and cash. Although they have to tune into the problems and try and create ways of surviving and developing them within…you might not agree with the system but that's how it is and

you've got to find ways of working within it but it's good lot's of people are starting to think differently.

J *I think it's been driven as well by…it's all interlinked, the whole problem with global terrorism, natural resources, first, second and third world all these things are forcing us to think about climate change, you know hurricane Katrina. They're all forcing the issue of we can't continue to use the worlds' resources as fast as we're consuming them and consumerism is fundamentally flawed because there's the have's and have nots and the have nots get pissed off and we keep buying this. I spoke to last night about The Apprentice, I don't know if you've seen it with Alan Sugar. These people that money hungry executives looking to make it in the city and he brings them in and give them tasks and they're all hungry to make money and be part of the extremes of capitalism, survival of the fittest. You get to the top whatever way you can. You build businesses, you sell them, you sell things to people they don't need just to feed the system and it's all just perverse to watch. Humanity has gone out the window and it's just like…they were selling cars and they were selling stuff with the cars that the people didn't need and that's were they were making the highest profit was in the extras and they new that they didn't need it and yet those products are probably made in the third world for a pittance and sold to a higher mark up and that kind of perpetuates the…*

FAR: ***Look to the government and look at the dodgy dealings they've been doing. So why shouldn't we do it this is it.***

J *It's all interlinked.*

FAS: *Just slightly.*

FAR: *What drives things, the drivers and I suppose what we need is new Ideologies to drive things in different directions. I mean there's loads of good people working away. It's kind of like…the Attenborough programme's interesting I think because they have been picking these sort of special movements to kind of really…they're very concisive and they're almost these kind of moments of enlightenment in every programme. They're really jewels and gems and they're saying if you're not going to be awed and see the wonder of the earth through watching this then you're totally cold.*

J *Absolutely I think that in that area, in that field, it's like a renaissance period, people just see it as popular culture but I think that's just not true. I mean one of David Attenborough's programmes is the equivalent to part of the Sistine Chapel in terms of craft, experience, the amount of time it took to make it, bringing it closer to the divine for a start. If that's what Michael Angelo tried to do when he made the Sistine chapel I feel the same way as probably renaissance pumped us with the Vatican tried to bring them closer to God through us we can get more money from*

them and maybe the BBC are doing the same thing so we keep paying our license fee.

FAR: The fundamental flow in it in a way is the tele. You know because we were thinking of this when we were doing the art gallery thing. You cannot compete, you can't even think about competing with the technical skill of the art. The technical skill is mind-blowing. It's like you say the Sistine Chapel. The weakness of it is that television is a context, because you're sitting there with your dinner or your tea and you're also thinking this is what the tele does. It just brings these wonders in and then you flick onto something else but it doesn't have that contemplative kind of feel and this is where you can still do something interesting in art galleries. It's a stiller space, it's a slower space. You can make it as contemplative as you want so you know and you've got to work with that context, the best context. It would be interesting to see what these guys could do in their types of spaces and stuff because I mean just a skeleton that's mind blowing. That's not to say what they're doing's not incredible. Its is but the tele has it's own problem with it in context.

J It sounds really stupid but you know may be 100 years from now they will have like a Sistine Chapel of information media within hospitals. You know you get spiritual support but you need to understand the wonderment of the body and I think as soon as you walk into the hospital you're degraded. I feel degraded when I walk into Ninewells sometimes. It's just the whole architecture, the whole environment is dehumanising from the minute you walk in. You worry about disease and infection. Often it's full of geriatrics that are wandering about confused, there's buses bringing them in. The whole thing is completely like…somebody said Ninewells is like a sausage factory you come in one door and go out another door and it's like this production line of problem solving or not.

FAS: You here of them closing wards because of diseases.

*J It's just a whole weird…it's a machine that is out of control. It needs to be stoked with lots of money on a daily basis and the government can't stop stoking and they can't put the fire out for a minute and then think how are we going to *** the fire so it's like the Titanic heading towards the iceberg. It's just like they're stoking it, everyone's on it you can't get off it. I mean my work it's just computer animation. People are dying people, people have got serious illness and I'm just tinkering with little images but maybe that's were you have to start maybe it's like if people have an awe about their existence then maybe they would change the way they feel.*

FAR: You can only do what you can do. All things get picked up on and then they don't. It's got enormous potential, you could do a whole programme for the BBC about it. Because I was thinking what you should be doing is you should be hooking up with some medical guy who is really clever and is interesting, yourself and maybe a few more animators and then

somebody from television. AHRC 1,000,000 quid to develop it all and then get the television involved and do a huge TV programme in two years you know with some interesting narrator that is sitting down talking about this is miraculous the way this all works and you know the kind of predators and cancerous cells coming in and all that kind of stuff. It would just grip the imagination and we might have that re ulance fo bodies maybe

J *I think you made two good points actually. One is that TV can be the downfall on trivialising things and it's almost like an appeal, it's like going for the masses can trivialise it as well. Sometimes if something's personal and like obviously in gallery space you slow the pace down and it often becomes a personal experience because there's maybe not many people in the space so the rules of engagement have totally changed. Whereas your sitting having your TV dinner and you could be doing something else and it's not that…*

FAR: Holyoaks You just expect these things to come in.

FAS Expect sharks to jump ten years.

FAR: You get a bit disappointed if they don't

*FAS: I suppose it's interesting when you talked about the decision to make these diaries programmes afterwards about they actually explain brain at the most of the image how long it took.**** so that you don't have…*

FAR: I think that's added a huge dimension to it in fact it adds to it because it makes you think these things aren't easy to get, these things are not easy to see, these things are not precious.

It makes stars as well of the artists that do it. The people that make the art. It just happens

J *I thinks it's often. It just happens they set up the camera and David Attenborough. It's just a cameraman to the minute it does into the can to be put on the TV it's not technology.*

FAR: Did you see the one with the snow leopard, three years never even saw one.It's incredible. Three years they took to get it.

J *The Taliban were using that as a route into Pakistan. From Afghanistan to Pakistan so they couldn't get in and the Americans were using it and the special forces were looking for Bid Laden in these mountains because that's where he's hiding or so they say.*

J *Great one more thing before you go but try and give me like which one you felt was the most innovative in 1-5. If you felt that the in terms of emotion information just sort of a top five of the images just so it gives me an idea of what's happened even as in gory.*

FAR: Gory.

J If you feel it is a negative or a positive. Maybe I can facilitate. So which one would you say was the most innovative

FAR: I think that one up there for me is pretty innovative and then I would say this one here number 2. I think for me this one and then that one four and probably that one five. Rest of dictation all about stickies 1-5 no real content.

1.7. Fine Artist U

Date: 30/03/06
Duration: 00:43:54

J *Well that is kind of the first stage, now I suppose the second stage is to sort of initiate a kind of dialogue and conversation on the imagery and maybe talk through some of the themes that are building into it at the start to do with sort of logical interpretation and the emotional side and then we can see where the conversation takes us and the areas that you want to talk about, at the end of it all, what I'm going to do as well is maybe ask you to score the images on a scale of 1 -5 just put the top five you feel are probably the most emotional but we will do that at the end once we have finished chatting if that is okay, so do you want to maybe talk through them*

FAU *Well of the group of images the ones that convey reactions to them as pieces of art work first of all and you know some of them I find extraordinarily beautiful and some of them do nothing for me at all. I don't know whether you want me to point these out to you just now.*

J *Yeh I mean whatever one you feel*

FAU *I find this one at the end here an extraordinary image and I think it is all the marks because it is aesthetic and three dimensional and sculptural, so I could image they could be quite successful with for what you are setting out to do in terms of somebody using it to explain things within it, the one next to it with the diagrams obviously a part of a discussion that has been happening but I think as a diagram it is very clear and I like the use of colour and light so this is very clear and well resolved piece of work both aesthetically and you know if I imaged myself in a discussion about the content. The one below I think again is a beautiful image it reminds me, it is just like looking at piece of sculpture I don't have any notion of the scale of it I mean if I saw that as a individual image I would be searching for, as an image I would need to know the scale of it, if I needed to know any more I would like some indication of scale. The one beside it here, it does something for me I find it over dramatised, it is over coloured for me.*

J *Do you think it is the red through*

FAU *Yeh and I find it slightly annoying because it kind of does neither one thing or the other for me, the one above, the sequence of the tunnel the light on that image is good as well and terrific movement, aesthetically it is really interesting what is in focus and what is not in focus it is a sort of kinetic energy about it and again it is obviously part of some kind of discussion that somebody might have and as such it would work very successfully. Now the centre three the one on the left hand side I just*

find it totally annoying because it looks like a tie in the dye a thing that you do at school it is fuzzy it is not giving enough information and it is not particularly interesting aesthetically and the middle one here is really dramatic and beautiful and again I think it is very successful and I see it very much in terms of the context of more to the left, more to the right of that kind of series of movement, blood flow movement and I think it would be, I think it works really well in. The one on the left the ??, I find that I really feel reassured by that image, it is calm and I can take my time I don't need to, it is all there for me to see and I feel that I can, well I enjoy it graphically and I just feel quite reassured by it that I understand that, I wouldn't understand if I was really facing something with no explanation there is something about its very specific quality that

J Do you think it is more humanised or more kind of ?

FAU Yes, I do

J Do you think is has maybe a bit of soul to it or

FAU I think so I think it is not in the slightest bit scary and I think it is, it kind of satisfies all the points that you asked me to look at it and the context about it, em, on the first panel the bottom one I think it is really amusing, the razzle, like the Oscars a bit of dancing figure and it is slightly amusing

J This one bottom right?

FAU Yeh, it is such an organic interesting kind of ??? agent and a little kind of dancing figure in the centre, it is really quite amusing, I'm sure it is not, that is the aesthetics side of it and I'm sure it would be quite constructive for somebody being, if one was to point out what the actual thread like things were and how they affected the sponge elements on either side, so yeh it is a good one. The one above it does nothing for me it is like a school higher street ???? or something again it doesn't tell me enough and it is kind of trying to be art in a funny way.

J It is maybe trying too hard to fit in with aesthetics?

FAU It is kind of contrived and it look over designed, if you were to take a, as I said there a prints that you would make at school, first year in the art school sort of thing, it doesn't do it for me aesthetically at all, might be to do with the while paper in its surround. The one to the left at the top it is quite sinister, it is quite frightening and I'm sure that again it would be instructive if you were to explain, I think it is too little to reassure you in any way.

J *Do you think it is an image that is maybe taboo or something that shouldn't be shown at something or part of our body that we shouldn't really see or?*

FAU *No I just think it is, you know you see these images in your visual art context quite a lot in terms of artists work that do work about, some do the body and internal organs and the kind of image that a lot of contemporary artists particularly women deal with quite a lot the kind of em, but at the same time it is, I don't know, I don't think it is a taboo I think it is, even if I were to be, if I was ill and confronted with that image I would, it would not reassure me it would scare me whether it is to do with the colour or the kind of graphic quality. The one below I like enormously it is the space and it is quite calm, it makes you feel quite calm and I know there are things happening in there that could be explained but I like that feeling of the sort of dimensional feeling it has got and that you are looking at that, outer space or a mountain range it has got, you are looking at all sorts of stuff in there that makes you feel intrigued if you confront it without being frightened. And the blood flow piece I couldn't get past the thinking about fish and wheat snack and stuff in terms of shapes of the particles and I found them, if I had seen this, if I saw that with ??????? and I really enjoyed the kind of pumping thing after a while you come into a rhythm yourself with that sort of pumping, a heart pumping with blood and I thought it was really interesting but I just think the shapes and the colour have too much ????? it is better with this one but the other two ?????*
Okay so that is what I think.

J *In terms of emotional content which ones would you say kind of in terms of their ability to stir emotion within you, how would you rate them in terms of, how would you feel there is one particularly or did you think they are all quite?*

FAU *What do you mean by emotion?*

J *Well just something that maybe it is difficult as it is difficult for each person something that has a content over and about just imparting the information to you, that is then a piece of anatomy*

FAU *Well this one here definitely does, ?????? you could possibly keep it as an image, it is fantastic that and I think probably these, that one there and this one here there is a kind of 2nd and 3rd*

J *Do you want to put a wee rating on them?*

FAU *So that would be first and this gets second and that one third*

J *Do you think there is a 4th or a 5th?*

FAU *Well the 5th would be between that one and that one, no that is the 5th yes.*

J *And in terms of the raw impartment of information do you think there is a scale*

FAU *Sorry*

J *In terms of the ones that you felt were the most informative, em they can be the same ones again*

FAU *That would be 2, probably this one but in a limited way it gives out, I mean that and these two 3rd equal as they don't give me a specific kind of ??? it is difficult to ?????? . you are asking yourself it is difficult to, if he said to me you are a cancer patient and you have this wrong with you and that wrong with you now react to it, it would change the whole thing round.*

J *??????? loads of information*

FAU *I was thinking is that what I'm looking for just as an issue*

J *It is partly to try and work out as well what sort of systems to try and probe some of these issues, get people to try and work out what it is and the most appropriate way to, really some of these issues are still quite delicate and using sort of quite a lot of the blunt tools of the social sciences and things you don't really tease out a lot of the fine sort of wholeness of an image combining aesthetics and functionality together and it can be seen as a trujective but there seems to be patterns forming and everybody reaction so far I mean it is a mixture of my imagery and obviously in some traditional ways of illustrating in medicine and that is photography, that is Gray's anatomy from 120 years ago and that is an MRI scan and this one is actually from a scan as well so they are all and then the rest are my own visualisations of the same pieces of information it is all borne from one piece of data, so I think it is trying to sort of work our this kind of human so the theme that seems to come through is this sort of humanisation of the imagery and I don't know whether that is*

FAU *Well I think if you saw role play from the information that you gave me if you were kind of playing a role of somebody who would be very vulnerable and very kind of a bit highly nervous and highly kind of vulnerable state can be looked at and if I'm faced with, in the past I have been faced with very traumatic medical situations for say I search for knowledge it is information that can begin to make me make sense of it so*

J *Do you think aesthetic would have, you know of having a visual images as well as I mean it is difficult to pull the two apart from trying to explain and still knowledge but also give a feeling of beauty and awe of what you are looking at, do you think an aesthetic like that would kind of hold*

you hand as he guides you through the process of knowledge or gaining the information that you need to find out about your illness?

FAU *Well if I can just give you an example from my one person experience, my first child was born with Downs Syndrome and when I went to see the doctors they didn't tell me what, I didn't know anything about Downs Syndrome I hadn't a clue I was a young 20 year old and my wife was young and we didn't know what on earth had happened, what was happening to us and the doctors were at that time completely callous and uninformed and casual and gave me no information and they, I went down to the book shop down here and the book I asked about what was then called 'Mongolism' a kind of book about Mongols and the woman gave me a book with photographs of cretins in it with huge heads and it just about killed me and then some days later my tutors gave me the address of a man who had researched on Downs Syndrome and had by chance a Down Syndrome child of his own and he wrote to us with a handwritten letter of 10 pages explaining exactly what the physical/biological problems of Downs Syndrome were, how to hydro stimulated, how to be involved in the hyper stimulation of the child with in the first few months of her life and drew us into an active kind of debate and active process where we could be involved and that made all the difference to our minds so my life example of this is absolutely the people are so, at this point as so as you will know are so vulnerable and then you think that scares or stimulates the imagination in an uninformed way like that which is just counter productive quite frankly but any thing, anything like this is to quite straight forward like the moon cat this point practically neutral and does the business of the explaining, something about this jelly fish here it is calming and it is not threatening and it is, I could imagine you could talk through that image and I would feel maybe unsure and unsettled by it.*

J *That was quite interesting because it does seem to be this overlap when you have a kind of image that has that kind of totality or has the ability to do both and then you sort of kind of really, I mean you are absolutely right the imagery is so crucial to, or the way information is presented in complex diagnosis and it is so important and it is an area that doesn't seem to be addressed at all, medicine. I think I mean it is because it is borne from the reductionist kind of focus on the small problems but forger the bugger pictures.*

FAU *Was the case of the Down, I mean hopefully things are better than they were then I mean we felt extraordinarily bitterly let down and I think it is the complete almost callousness of the doctors at that times who were quite casual, take her home if you want, leave her here if you want she will never amount to anything you know, this kind of which probably was quite rational for them in their position of this happening as a daily life process and that, I mean we were not alone, we were not alone in having that reaction in terms of the problem with first contact with Downs Syndrome but I'm sure that other, I'm sure it is the same thing*

happening with kids with forms of cancer, kidney or bladder ?????/ statistic examples.

J *I know, it is this kind of lack of appreciation of the holistic problem I think science has called, I mean they like to see human beings as systems but they are not all, I mean like you say things probably improved but they have not improved all that much that doctors still sketch on the back of envelopes and use an anatomical models to try and gain consent from patients which I find so bizarre and that they take pictures of your and tell the body space which they do, have you never seen those pictures, how somebody, if you were a photograph you wouldn't ask to see the picture but it becomes exclusive property of science and yet it is part of the romantics part of your private space and yer, I mean that is changing now there is a lot legislation and the Food and Information Act and doctors now are much more accountable to what they do, what they tell people and if people are not properly informed and they make decisions based on fact that isn't correct or id they have misunderstood then the doctors leave themselves open to lots of problems so science is starting to look at ways of trying to illustrate that but my fear and this is why I'm trying to run these sort of experiments is my fear is that is it not the raw job of the artist to just provide illustration there must be more to it than just like almost like creating the modern version of Gray's anatomy and its context as there is such complex information and action happening when you look at an image in that highly emotional charged state that you will be in, I mean I heard a friend of our he and his wife at their first child and he is a doctor in Oxford, he is qualified really top of this game and hw as on the wards and got a beep to call as his wife had been rushed into hospital and when the baby was born three months premature and he was taken in and his wife really ill, the baby and the wife are fine now everything turned out okay but he said it was really interesting that he was called in to meet the obstetrics consultant to talk through what had happened what was going on and then he sat down and obviously he had a medical brain he knew what was going on he knew what was happening and the doctor explained it to him just to say what the specific problem was and he said the doctor spent 20 minutes trying to explain to him and he took, he said he took absolutely nothing yet I knew the words he was saying, I knew what was going on but I absorbed no information because I was completely it was completely over my head I just couldn't take anything in at that point and do you know what I mean is it like this whole complex process that humans have that it is almost like a part of your brain that deals with logic switches off, well I don't know if it is as maybe as cut and dry as that but I find that quite an interesting and I don't know whether, maybe imagery can allow some things to be recalled and remembered and access to it at the time when people are trying to understand really difficult issues, I don't know.*

FAU *Yeh I suppose the other thing is that it is probably really different if I had this sort of white coat syndrome as well we are taken in to doctors*

office maybe the information you can take it home with you and you know sit down with a glass of wine and think right, at home lets have a look at this and over and over again and ????? I think that ??? I mean it is not, I don't mean that sort of simple pack of Janet and John thing I mean something real with quality with the best ????

J *Do you think that the whole process of trying to create an awe about our own body spaces and the screening of beauty and the kind of, the kind of harmonies that happens and structure in our bodies as a place in a wide context rather than just purely like one-to-one then answer peoples understanding about a general ability to engage a wide audience in the, not just the understanding but the beauty of the human condition maybe.*

FAU *I think do you remember that film when the guy was reduced in size and injected into somebody's system*

J *Fantastic journey was it, the one with Donald Pleasance, there is a newer version of it made as well in the 80s as well.*

FAU *I mean that was really fascinating and really interesting and I know it was science fiction in terms of, I think it is very different thing about the content and something that has physically happened to you as an individual, I wouldn't stress the situation if I had just been told that I've got cancer I wouldn't be thinking about the aesthetics I would be, I would want the information and as precise as possible but the aesthetics can certainly help, it would help me it would be being very visually aware I would be frustrated if it was like that ???????em*

J *Do you think there is a scale there of, I mean obviously the photograph and the one that looks a bit like an x-ray which is an MRI scan are the closest to the truth because they are the ones that come from, they are the ones that come off the scientific equipment, they are closer to the truth than the rest they are kind of, using that as a start point but an enhancement of that the artistic interpretations of that using contemporary media do you think you would want to be closer to the truth or would you want something that was easier for your to understand rather than something that is as exactly as it looks do you know what I mean*

FAU *Well I think not dividing the issue but I think there is absolute place for them both if that photograph if that ????? came up together and were overlaid on photoshop or whatever and drifted apart from one another and allowed time to go I would tend to go back and force ?????? I think that I don't see any problem with the combination of the two things working together but a matter of the production.*

J *The one thing with that one is that Gray's anatomy is the only one that has annotation on it whereas the rest are just images on their own.*

FAU *I think, I'm just thinking in terms of like of your seeing something like that if there was an ???? and the relationship between that and the appropriate ????? images, I don't know it would be up to the way that you produced it but that would be one way of answering both of your questions.*

J *It is really interesting Gray's anatomy it is like a surreal, it is like something that is still used today and it was kind of born from that whole Victorian push towards describing using, it reminds of Brunel and a lot of the drawings that were kind of produced in that period and styles in map making and discovery and expansion of the Empire and Darwin's book and these kind of botanical illustration that you have done on all these ships that went to the new worlds, it just has that kind of, although I know that some people describe it as a non-style because it is so kind of pure in its information department but I don't agree I think that is has got it own style in itself it has got a*

FAU *I remember working for archaeologists out in Rome and they would want me to come and draw the objects and he would say to be ???? and your artistic style in archaeology, in archaeological drawing terms a line where a dot have half characters for information that you have to learn to use so these drawing were, especially when they were on stone litho had a really ??? quality about them, the uses, the mark was quite was tightly structured it was almost like the Egyptians and a dot means, dots put together means things moving round or whatever. But when I was in art school, it was a long time ago, we did anatomy for two years and we had to pass anatomy before we could do another year and they were quite, I mean the first time we did bone structure and drew the skeleton then you went on to the muscle structure you didn't go on to blood vessels or anything but you were examined on the names and all things and you were trained to draw the directions of the muscles and where they inserted.*

J *Sounds to be really useful it is something incredibly useful, I wish I had some back ground in it because I find it quite hard to try and remember because to me I was constantly reading trying to understand where in the body all these bits are and it is difficult to.*

FAU *So we were given a printed skeleton about this size and then we had overleafs that we had to draw and as the muscle built up you turned over another sheet and some others ???????? they were really important because when you came to try and understand the life drawing or painting which is reason for it you could understand what was happening physically, the muscles overlying*

J *As a ????? it is a good model as it is something I've heard about before in animation where they have, a problem with a lot of animators at the moment is they can draw specific poses but they don't understand the overall structure so then the anatomy in some funny poses they know so there was a situation that was, there was a guy*

giving a talk and he was working for Rich Wiliams down in London and they brought some guy over from Disney who thought he was a shot and they all kind of thought he was a hot shot and he was working with these 5/6 British animators and then the guy from Disney and they were all a bit jealous of him and anyway they got this brief to draw horses and to draw specific poses of a horse doing specific things in this shot and then they sent them off to do this in a week so they gave them all the poses they needed to do to build the short so basically all they had got down to work at the desk but of course the guy from Disney his model of how he built was totally different he didn't go to his desk he went to London Zoo for four days and drew horses for four days solidly, didn't do any animation and all these others guys stayed in the office and drew all the poses and by the Friday when they came to present it all back to the director in fairness to all the British guys they had done a good job and they had got the stuff done and the animator from Disney came back he did it in the morning what had taken them a week to do, that was all the poses and then the director said right okay I want you to do another series of shots and I want to see something different and of course they took another week to do that with the guy from Disney took another day because he had spent time learning the anatomy, drawing anatomy so he could do the horse in any pose in any shot without having to sit and choreograph it all out, so it was sense at the same time.

FAU It is we were ??????? last year but interesting enough we taught her for many years and his anatomy drawing was extraordinary because he touched what he did he taught it every day of his working life and all his drawing have been kept together and have been published by fine art, I can't remember I think Watson has got something to do with publishing of them, it might be really interesting for you to track them down, ?????

J Sorry what was his name

FAU William Cadenhead. Jackie in fine arts, secretary should know what stage it is at or where they are and I know that fine art are in the process of trying to publish but hopefully you could just see them.

J Okay, great there is a lot in that, thanks for your time

FAU Pleasure

J That has been really interesting and these dimensions of the work and I think the next stage is to kind of talk about the process of developing the imagery and the diseases they are linked to generally building the narrative round the poetic side of the image because they don't function as stand alone entities in that fact they kind of evolve and grow with the narrative.

FAU No I think what you are doing is really important and I think there is a real value to it and I think the difficulty is making, well the important

thing, function for you make medical people realise that you are not really illustrating you are a new tech illustrator because that is what you are so I think it is absolutely needed and genuine in our research and if there is anything I can do to help you further in time just let me know, as I say from my first experience

J *It sounds as if you had an awful time*

FAU *I know exactly how that*

J *Was that in Dundee*

FAU *Over in Fife*

J *Right*

FAU *I mean it is along time ago, I mean my daughter is 33 now, so 30 years ago was a long time ago but I still remember that, I remember that kind of whole kind of dramatic*

J *Even now though you hear some terrible stories, not terrible but progression, there is a definite link in culture and medicine at the moment that undermines the whole concept of caring and humanisation it is very much obsessed with the mechanics and the high tech nature of delivery of medicine, not necessarily concerned about, I mean it manifests itself in many forms but things like patients are not often, their hand is not often held, or they are not kind of touched or given any physical input they might be pumped full of drugs and given all the best care that technology can provide and I don't think it manifests it self is the way that the older generation are treated in medicine as well the whole kind of working and like bed blockers and as if getting old is some sort of thing that is going to inhibit medicine and there is this kind of culture is that medicine is for the young and it is high tech and that is where it is at and you watch these television programmes like ER and you don't see the main stay of the diseases that really cause the problems, you just see the, it is a kind of completely distorted view of the reality and that is in the publics minds eye as well, people have this kind of.*

FAU *Well you look at the pathetic.*

1.8. Art Historian Q

Date: 31/03/06
Duration: 00:42:56

J *It records on to a memory chip but not exactly pocked sized. Okay so the second stage of the experiment is to look at more of the dialogue and conversation now you have had a chance to look at the images and just go through the kind of areas, the first one was sort of the logical images, the images that you though imparted more information than maybe some of the other ones and then go on to the emotional ones that you felt were quite emotionally loaded, I mean it is open ended Murdo how you felt about any of them it is more just testing the water it is more a pilot study at this stage*

AHQ *I suppose the thing I found really interesting is how much the actual video conveyed just something because there was rhythm there which is so absolutely critical to life so just being able to see the rhythm of the blood flow which you can see in any of the other ones even the early anatomical ones or the much later computer generated one and I thought that was an incredibly powerful difference actually, which is not to say that I didn't find these interesting in the terms of the information they convey I think what, I think I would probably want to distinguish, no it is a bit difficult because it seems to me that they are all valid for different purposes and different people might find them useful in different ways and I suppose this is where, I felt they all conveyed something about physical images, are there any that are not to do with kidneys?*

J *They are all pretty much to do with kidneys and flow into the kidneys*

AHQ *because I wasn't quite sure what was going on here but it looked really interesting, is this blood flow race or something?*

J *Yeh it is my interpretation of a graphic representation of blood flow into the kidneys so the diseased bit is the bit that is narrowed because the kidneys have been starved of blood*

AHQ *Oh I see so that is, I find them all intriguing actually but in a way, well if I'm going to treat them in different ways basically and I liked them all in different wasps, this looks like a CT scan*

J *It is a MRI scan, all the images are built from that one piece of data.*

AHQ *Oh from this, that is interesting yeh, now I'm getting my barings that is a fascinatingly dense image that I rather like for its density but I fully understand if you were trying to communicate something from it, it is*

far more what the radiologist would want rather than what the patient would want

J absolutely

AHQ So all this data is actually generated from

J Except that one, that one is another version of that disease it is the same disease but it is not that one scan but everything else is.

AHQ So how do you develop the blood flow, you tell me?

J Well the blood flow is sort of developed, it is added it is very much artistic interpretation or artistic licence to develop that to almost another level to the very static geometry that comes off the scanners

AHQ Is there any attempt to be accurate in terms of number of customers, so it is purely I mean it wouldn't be medically correct but as I said initially it feels very rhythmical correct and it could be good in communicating information in an adequate kind of way

J I mean the animation itself is actually based on a cardiac cycle, it is like spray and then pause and then spray

AHQ that is one reason that makes it very attractive as it is in a heartbeat rhythm and that could be and obviously you will have thought of this John but that could be deeply useful in the presentation of information because it relaxes people, it is as simple as that. This one just because it looks almost like a direct photo

J I mean it is a direct photo because it is from an endoscopic camera so it is a real to the truth as you could possibly get, I mean this is the kind of scale or spectrum of truths this would be at the reductionist end this would be exactly how it is

AHQ Obviously most people have some sensitivity to blood and gore and all the rest of it so from an emotional point of view I react to it like that although I don't actually find it particularly horrific or anything like that, so I mean obviously what I'm saying is slightly coloured by the fact that I don't think you are interested in communication of information to patient groups.

J although it is sort of, I'm trying to look at how, if we change the context and these images are then shunted into this context and navigated in a different way, what I found already is everybody cannot separate the fact that this is from people and it would have a purpose to try and explain a disease it is almost the aesthetics seem secondary but in fact maybe they are woven into that process of interpretation.

AHQ I think this is actually where the ambition comes in as this seems to transcend that obviously everyone know what you are doing so everything is slightly coloured by that but I mean these in themselves I wouldn't really regard as, funnily enough the one that has the most purely aesthetic power is actually the original CT scan but it doesn't have the most communicate part but obviously what you are concerned with is the communicative area but interestingly enough the two ones that have the real power are your animation and the original CT scan and they both seem to exist somewhere for me that actually transcends the kind of dynamic quality that is around today.

J I mean do you think any insight into the beauty of these objects or artefacts would give patients, not just patients but give people the kind of wonderment of the body and the aesthetic holds their hand to the functionality, it guides them in

AHQ Well this is where I think the animation really worked without a shadow of a doubt I think in a way it is slightly unfair to these images to have them in the same room as the others because I think, I kept on getting drawn back to the animation just because it has a literally, not literally hypnotic but it is related to that just the rhythms really and think that is such a powerful thing, I mean it just reminds you that the rhythm is really there and I think the intriguing thing with respect to your research is how you actually managed to bring those two things together, I don't know how you were going to do it but I think it will be really fascinating well I'm sure it is already because I've seen a lot of your other images and they are absolutely fascinating actually, em I'm just wondering if part of the, in terms of certainly responding to the images I'm not sure this is the best way to display them, I mean this have got nothing to do with patient response or anything like that but it is almost that they are slightly competing with each other and I mean I would like a little flip book of them, see what I mean, not that I'm saying they are a flick book but I'm just saying it is also being stuck on the white boards like that they are kind of lacking in intimacy and it looks like a, I mean it is a medical, but it is more and actually this one I find really aesthetic well I find them all aesthetically interesting in different ways but I actually find this slightly in competition with the other ones round it, I don't know where I'd like to be able to focus on this separately.

J Do you think it is important, I mean they are altogether but there is very little narrative to back the story, there is no story to attach to them

AHQ What I'm saying is I think they need even less narrative, I mean I'm not saying that would always be the case and obviously if you, but purely as aesthetic objects I would actually give them more space, I mean I find this one I find very interesting as well but just because

J The middle one next to the Gray's anatomy one?

AHQ Yeh, I mean I like this, this has got a whole lot of resonance's to me because my father was actually involved in cancer research and he was actually right in at the beginning of getting computerised timography and things like that so that has got an extra resonance for me he would be fascinated by what you are doing, in fact if it ever gets into a compact thing I could run it by him because he was really right in at the beginning of the linkage of computerisation and treatment plans and actually there is a cancer research hospital in London, the Royal Mardsen and absolutely at the forefront of lymphography so it is very much your end of things actually, but if you take this image I think it is actually suffering being stuck between those two, this has actually got a, it has just got, I mean I think in a way they just need a bit more separation as they are intrinsically interesting in their own right.

J Do you think there are ones that are better in impacting emotion and images that are better in imparting information?

AHQ Well I think it depends, I don't really think so actually, sorry, in a way if you know what that is meant to be imparting and that is strong information and similarly with that one I actually find that very emotional as well just because I think it is great and I like the type of physics it represents and all the rest of it

J I mean the physics is almost poetic in itself, I mean it is the resonance it is the relaxation of the resonance of the particles that circle in a water atom, you know the hydrogen circles

AHQ Oh is that how it works?

J It makes changes, I think changes the frequency or the way they rotate round the nucleus and then when they switch the super magnet off they relax in different ways depending on the tissue they are in and so they measure that in terms of black and white and they end up with image, it is just

AHQ Try to use that John and in fact I must show you some of my pictures of, do you know the hydochamber of physics it is just that one of the, really the for the first half of the twentieth century the only way of tracking sub atomic particles was shooting them through a super saturated vapour so they follow the condensation trail and this was invented by a guy called Wilson who came from just outside Edinburgh so he invented this thing call Wilson's Cloud Chamber and it is how a lot of practical physics was made and you would have almost certainly seen, the thing that replaced the Cloud Chamber in about 1955 a really important thing which was done was the bubble chamber and it works on the same principal expect it leaves a track of bubbles in a liquid, liquid hydrogen or something and you know these things have gone through spirals etc and it was right at the cloud chamber photos and it really, so the whole poetry of the subatomic level or the molecular level I mean you have got a whole sculptural world

J *I mean it is fascinating and often the paradigm that it comes from they don't see the poetics in the truth they are looking for, I don't know if that is the best way of putting it but they often don't see the wood for the trees almost*

AHQ *Well I think that is true, but I think that they do but they are bad at expressing it.*

J *That is it, that is a good way of putting it.*

AHQ *Of which you can probably make a big input on that, that is essentially why we need to be in touch with the scientists to help them realise that they do have aesthetics souls after all.*

J *Well this is the other thing, people say oh well your images are hand crafted you make art from science but if you actually look at the process of making an MRI and the process of building the machine, and the process that the radiographers and the training and the craft that they learn, if you break that down that is a craft, it is just a different artefact at the end that they may produce but the process can be seen and could be argued as artisan apparently someone told me that these MRIs, the one in Ninewells has just been put in 6 months ago, state of the art, there is only a few of them in the world and the guys in Bavaria who make them hand wind the copper wire round the magnet by hand.*

AHQ *I mean this is actually really interesting because the thing that really sits between art and science is high level craft skill and it what really joins everything together it is a kind of plane of activity that has got certain aspects of design and architecture and it sits right between that an science and links everything up but wow, I'll have to get you some of these cloud chamber photos you would love them they are really phenomenal*

J *I think I know what you mean I think I have maybe seen some of them because I think a lot of these guys that do a lot of these amazing things and special effects when they try to make water digitally they do a lot of the experimentation using these physic simulation systems*

AHQ *Very possibly yeh, anything with a, basically what was happening was, you basically smash an atom up to get the particles going off and then stick a magnetic field onto the track that they would be going so that anything that had a magnetic filed on it would spiral, or bend and then leave the condensation track or the gas track and the bubbles so anything with a lot of tracks and spirals in that is a cloud chamber or a bubble chamber photo basically.*

J *I'll check it on Google*

AHQ The odd thing was the last time I Googled I tried to Google on Wilson's Cloud Chamber and I got virtually nowhere, I was really amazed it just shows that not everything is on the internet, I mean it should but it was actually quite odd, I mean there is bound to be search engines that would turn it up and I eventually got something on it but it was surprising and again it is surprising how it has been forgotten really despite the fact it is the key visual of physics for the classical period of nuclear physics you would have thought something like that

J A historical artefact

AHQ Oh yeh, it is incredibly and the fact it was invented in Scotland that is great as well, actually he was on the top of Ben Nevis which is even better

J Oh really

AHQ He was a meteorologist and he went up to the top of Ben Nevis to study cloud formation so I'm not sure whether he invented the cloud chamber up there

J I find all this fascinating it is like Gray's anatomy and then you look at the heritage of Gray's and you look at how these anatomical books were being built in that period and they were influence by people like Brunell, the map making the expansion of empire and knowledge

AHQ Increasingly in engraving techniques as well

J Oh yeh, of course they are all plates

AHQ I mean to me if you don't have the technology to make essential a steaming ?? which is another area I find fascinating

J I mean they are tiny I mean I have blown that one up but that was quite a small engraving and I've blown it up and you can see all the marks, it is almost they are manual marks almost.

AHQ I don't know if you have every wondered down to ?? area because there is a couple of engravings on the wall there that is actually a Turner engraving

J I think I have seen them

AHQ And it is just the level

J The craftsmanship, I mean it is probably dead now all that craftsmanship has probably gone

AHQ But a lot of it was also Scottish and even for Turner it was a guy called William Miller and it was absolutely brilliant, well anyway, what were we talking about?

J Well I suppose we were picking up on the intuition and the some more obvious images compared to ones that are more emotionally loaded and trying to just sort of like, but you were saying it was possibly difficult because they are all competing with one another slightly

AHQ I think in a way, I think the images are to some degree in competition at the moment but that is just the layout thing but I'm not sure you could have done it any other way, so not a big criticism but it is hard to glimpse through these and not really think about them apart, if you see what I mean but in terms of the, I think the thing is I think this one, the pure one is too emotional to use I would have thought on the other hand a lot of the others, ones like that which are I suppose you might call first and foremost aesthetically driven rather than information driven, they are not really are they as the is so much information in there and it seems to me that ones like that could be enormously useful when you want to particularly it there is some kind of animated element where there is a bit of rhythm or something like that is to get across to people

J Do you think they give you some sort of awe, a lot of people are trying to draw comparisons to the David Attenburgh approach building awe through this kind of narrative and the beauty of nature rather than using the aesthetic to drive you through the function, I don't know if that is a cheap way of describing it but that was something that came out yesterday but I don't know if that is the case, I mean I created those two images, I always had the function in the back of my mind but I was trying to create a specific almost an ambiguous image

AHQ Well I like that aspect of it actually, I think it really works in some ways and there are ambiguities but I mean are the ambiguities what you are after or presumably some of the time

J I mean for instance you can see a narrowing there, there is less of these red blood cells going into the narrowing and to you eye is drawn to that in the image but then you are kind of also navigate round that in almost a space age way, I don't know if I was watching one of these explorations to the cosmos that week but all the images I produced during the period of making some of these images all had this kind of, it was almost like the Voyager probe or the Kissini probe as it goes out and I always had that feeling like I was looking into this world and I kind of felt a bit guilty for looking into it but I also felt I was holding onto this probe for dear life as it dragged me around these places that people have never been before or never been presented in that way.

AHQ That can be interesting and obviously they have in old science fiction programmes, inner space being a favourite one naturally, but taking it that it get thrown into

J Oh yeh Jack Putter to the rescue

AHQ yeh that is it, but I mean when you say getting drawn in, I'm not seeing that here and I'm not saying I should be seeing it here, but I would be really interested to see that but some of it is there in the animation. So how much data, the idea of, how far away is the idea of, I don't know, scanning a whole body, just like plugging yourself in

J What do you mean plugging yourself in?

AHQ Well just that you would need a massive amount of data just to go on a travel for instance

J They do have them now, they have full body MRIs now you can get a full body but it is a very time consuming process it takes a couple of hours to do as they do it in sections so they slice you up in sections but the problem is it is almost like there is a general perception that scanning means that you scan for everything but it is a bit like a camera that you only have a certain filter on the end of the lens and you are only going to capture a certain view of the world or a way of seeing the world and these scanners are the same and with MRI they have different lenses they put on, they call them protocols but they run different resonances and they see difference things so when people get referred they look for different things so equally to do a complete voyage around somebody you might only to a voyage around the area that they have scanned for that snap shot in time that they have taken, but it is really fascinating because that isn't actually, that is a cast of blood flow that image and all these images are taken from what is called an angiography which is basically they run sequences based on the movement of blood through the organs so that isn't a true reflection necessarily on the shape of the anatomy it is a true reflection on the blood flow, if you were to put plaster of paris into your vascular system and then cut everything away you would be left with this blop and that is what these images are made from, so you are almost, it is almost not quite true to reality it is almost I don't know how you would describe it but it is a casting process

AHQ Another filter isn't it.

J But it is interesting because it is often as well that it is the healthy bits that it images because places are unhealthy in the body don't get blood and they don't show up on the scanner and that is the problem, that is why they go in and do these things because it doesn't show where the blood is, so if you smoke too many cigarettes and eat too much fatty foods you

AHQ Well that is what I find interesting about some of your earlier images when you could actually see the, I think there was one you did of the arteries in the thigh and you could actually see of them with the blood flow tapering off to an end or something and it is that kind of thing that is extremely informative actually.

J Yeh, that is quite interesting because I built those purely on the goal of imparting information, I tried not to stylise it at all, I tried to make it sort of Mickey Mouse or Early Learning Centre to try and impart the information but in some ways do you dehumanise it when you do that, does it loose its humanity, does it come from

AHQ I suppose it depends on what you are doing, and I mean I guess the other issues is if it is not to be dehumanised and it has to be obvious to the person who it comes from there is a time issue isn't there?

J Yeh, I mean most of these images can be achieved in real time, I mean that one could be achieved in real time the one that looks quite hazy, that could be done in a couple of minutes from the minute you take the scan to be piped to another room that is achievable now but to achieve this level of craft and detail is a long process and the animation takes a long time as well so it is not, it is almost like building a documentary about the body rather than designing something for individual people, but I am still of the opinion of pushing this level of aesthetic even if it takes along time technology might catch up to that process that you can incorporate it

AHQ I think so, presumably you build a general model which is possible to customise so the patient could get a rough idea.

J I just kind of feel Murdo constantly torn between building a functional useful thing and then making more of a philosophical statement about

AHQ I'm sure, just get the thesis done and then we can get on with the real work, it is the Wilson's Cloud Chamber

J Yeh, I'll have to check that out as it sound absolutely fascinating

AHQ You have no idea, it is just so beautiful the images and as I say they are really like some of the things that are going on here.

J I mean the difference as well you do get a lot of medical imaging in terms of using contemporary images and you do see a lot of these electron microscope images of what looks like tiny mosquitoes or gnats your body and all these sorts of things, but what I'm trying to ply is a fundamentally different process, it is actually using the data as a start point but crafting it to build essence almost, to try and describe it in a different way, I'm in pursuit of a different truth rather, it that is the right way to describe it. I think I am trying to do two things at one and maybe that is wrong but I'm trying to impart the information but trying to

bring this kind of humanity to the image through an aesthetic almost like to the poetics of an aesthetic I find it difficult to verbalise but I mean just looking at this image at the end there the one that looks like marble with the very soft shadowing again that is produced from that one piece of data but has a very textured and subtle feel to it but it feels dead it is not alive because the blood is all drained from it but I wanted to compare it against this other one here which shows the internal structure of the kidney and they are both taken from the same piece of data but they both reflect it in very different ways, you can tell a very different story and again the vessel there the light at the end of it was again taken from this piece of scan, this scan here you can't see the vessel as it is not in that slice but that is looking inside that vessel

AHQ Right so the actual dimensions of the vessel are in side there and how does that apply

J It is the same in this one as well

AHQ Because I do find it, it is interesting because I can see generally from the animations in one of your more purely aesthetic works

J I mean that is from an animation sequence but that was a while ago where all the particles are moving in a linear fashion as they are all aligned to the same pole whereas in this I have basically built in a randomness to it so they randomly collide with one another on the wall.

AHQ I'll tell you something that might be interesting, it might be aesthetically interesting and also practically interesting for the medical scientists and that would be if you actually put in approximately the right number of blood corpuscles which I presume wouldn't be too hard to do actually

J It would be hard to do but they probably don't have machines with large enough memory to cope with the number of particles.

AHQ That is always the problem, the problem when I wanted to rotate four dimension space in a psychology department in the 1980s, no chance, I think I could do it now though

J Oh really

AHQ Well maybe not

J I don't know I don't know enough about it

AHQ Well it is just that I had this notion that, well it was quite fortunate that I couldn't do it as I wouldn't been able to do it and I wouldn't have done it anyway because my notion was there were two ways you might encode, when you are born the brain is relatively plastic and I was just wondering whether you have an innate notion of three dimensionality or you just have a innate notion of dimensionality so basically if you are

developing as an infant if a notion was just dimensionality would you have enough computing power, well you should be able to see four dimensions no problem well it might have been a wonderful experiment for the kid you go through the rest of his life seeing aliens but I couldn't have done it on him so it didn't really matter that the computer power wasn't there.

J *That would be cool, you have got these huge super computers that you can hire time on it and it will do anything that you ask them*

AHQ *I reckon there would be enough power around these days it was just more than they could cope with at that point anyway.*

J *I think is it pointless to build all these particles into it, it is funny I was chatting to Will yesterday about it and he was saying it reminded him on confectionery he kept thinking about it like*

AHQ *Well this particular bit does (laughs) but Will drinks blood so you know, you will have to edit that from the recording because he told me not to tell anybody*

J *Keep my garlic for the next time he comes then.*

AHQ *Yes very wise*

J *I think a woman said to me 'had I thought about building it to a sequence to play in cots to babies' as there was a guy who thought it would be useful to get his baby to go to sleep.*

AHQ *That rhythmic side particularly the Disneyfied bit like that one, that would be very good about getting kids to feeling okay about medical procedures and I think*

J *I know there is interest as well in the whole notion that the explanation of the term of body spaces is an incredibly complex and beautiful landscape that has hardly been navigated at all, I mean we have navigated in its totalness that we see these organs as a total unit, we know what kidneys are and we probably know there are tubes in our body but we don't realise the huge complexities and processes that go on a minute to minute basis.*

AHQ *I mean it is fascinating because obviously there are blood corpuscles which are completely out of scale and all the rest but I know that you are just representing blood flow and it is incredibly effective I wouldn't even be thinking about these other things if it wasn't worth it but for example you could work out a number whereby each one that you have got there represents a certain number of actual ones if you see what I mean.*

J I think I could probably do it, I could probably find out approximately how many red blood cells and how many white ones make up the average pint of blood and then get the calculations from a cardiologist throughput and then just work it out from that

AHQ I mean it just strikes me it would be really interesting to at least be able to make an observation on that because I mean if you actually put it in quotes realistic animation we wouldn't be able to see anything anyway because it would be too dense I would suspect but just making that very point is actually very useful as it tells you more about the actuality and the type of symbolic representations that we have to make, I mean just watching that has made we think about blood flow so much.

J it is incredible, I didn't realise this every time I spend time up in the hospital I learn something new every time I leave but everything you do is so dependent on the flow of blood and when we are sick the blood sends it round the whole body as well, so this system, this vascular system of circulation is incredible the best thing that could happen and it would be the worst thing that could happen as it spread everything round the body so efficiently and it oxygenates muscles it carried nutrients it does everything, I mean things like if you get diabetes it affects your blood flow, that is what causes restrictions and causes deposits, if the wall, I often thought that when you get a restricted flow in these things it is to do with gunk just building up but it isn't the gunk actually migrates into the walls and then the cells react to that and it is almost like a defence mechanism because of this gunk and force the walls up, they swell up which causes the narrowing and they can sometimes break and there is haemorrhage and there is a little clot shoot into the system and it ends up in your brain and you have a stroke or alternatively they flow like a river and if there is a weakness in the river further down stream there is more pressure put on the banks and that wears away.

AHQ So you are just saying I shouldn't have had that bacon roll this morning?

J No

AHQ Oh God

J Or that cigarette

AHQ Fortunately I don't smoke, but there is so much opportunity to demonstrate that sort of thing isn't there. I mean you are not going to have time because you are going to be working on the cloud Chamber unfortunately.

J I mean that is a vessel, that is a vessel from that scan, it is interesting that computer graphics allows you to build in some of these things I mean you could have never done this a few years ago when basically

you call tell effectively an animation was a piece of software designed for artists you could put in a fairly elementary equation and attach it to each one of these red blood cells and tell them to rotate randomly and collide with one another and collide with the wall and when you set it off you leave it for an hour and your come back and it does all the calculations of all the impacts and then you build in your own animations on top of that and then you render it out as stills, like a flip book

AHQ God it would be fantastic to develop an animated equivalent of Gray's anatomy wouldn't it, a big job.

J I think something that Gray's has which is quite powerful is the annotations of the text and I think that is something that maybe useful in the

AHQ I mean I love that but the funny thing is I'm really associated with what you are doing there with than engraved image because they are both getting to the heart.

J A lot of art historians criticise Gray's, I mean Martin Kemp doesn't like Gray's at all he slates it constantly he describes it as dry, dull, non styled information impartment.

AHQ Oh that is a bit boring of Martin.

J I know

AHQ Yeh but Martin has got off on too much, but I'm quite surprised by that actually.

J It was just an article I read recently and it was in the Visualising Science book that they brought out and it has all these articles from nature and I think he has got it. Okay one thing Martin before you go is to try and get you to sort of scale them if you can do you think, not really.

AHQ On what?

J One being, the top five, one being the one that imparts information best and sequentially going down, 2nd, 3rd, 4th and fifth and then the one that is the most emotional.

AHQ I don't really think so because I think they all impart information incredibly effectively but in different ways actually, that is the real thing, I mean obviously I'm really taken by the animation because it has that, well it has got the human rhythm to it which immediately pulls you in so in a way that get one so everything else gets 2 essentially and also I wouldn't want to give a false scaling that you would take as implying usefulness of information because that would be completely conflated

by my own views and interest, and I am also deeply involved in different ways by this.

J *Everybody has a different opinion on the ones that they prefer, I mean a lot of people like the insight the one that looks like glass and others prefer the more sculptural one that looks like a block of wax and then others prefer Gray's.*

AHQ *If you want me to just give a pure preference I can give you a preference but I mean that is all it is not actually a*

J *Whatever you think.*

AHQ *But I have this problem with imagery, I just like images*

J *I think the beauty of medical imaging it is so, people can relate to it as everybody is a human, everybody has these bits.*

AHQ *I think the real issues is if I spend long enough looking at each one I like it for different reasons and that is because you have actually put a lot of time into it and that actually comes out and this is a great compliment actually.*

J *Well I suppose I'm trying to look at my own practice and why I have made them look in certain ways and it is almost if I become overwhelmed by what I'm looking at it is reflective on the output or the artefact.*

AHQ *Initially I didn't really take that much time on that one but I find it really fascinating.*

J *But that applies, they call it tomb rendering but it is something that is used in the animation industry to make 3D graphics look like cartoons so they don't look like they are made of plastic, everything looks like plastic when it is computer generated often.*

AHQ *That is interesting as I always felt that the early so called computerised really suffered from that, the stuff that slices stuff, William Lathan, was it*

J *Oh really I don't know that one*

AHQ *I can't remember but you know how if you have got these marbling effects you get so bloody bored, if you want marbling buy some marble.*

J *I remember there is a guy called Jim Blin from the University of Utah, this eccentric with a beard who goes round the academic and he invented Blin Shaders which is basically why everything looks like plastic in computer graphics because he amended the algorithm that allows lights to make it look like it is made of plastic so it is all his fault.*

AHQ No I better head off but that is most interesting

J Thank you so much

2. Full Study Transcript Data

2.1. Scientist A

Interview with Scientist A
Date: 17/10/06
Time: 09:30
Duration: 1:21:25

J *So we are going to go up this end of the room Paul first of all and we have got a mic on the floor so we don't have to stand close to it, so it can pick up the audio and I'm going to take you through basically the visual work, now some of it you may have seen already through the project and some if it you won't have seen and the screens are split in two, one is very much the scientific imagery in the scans and one is the 3D visualisation work that I have been doing, so you can regard one as very much the scientific kind of thing and one that is the sort of interpretative but still embedded in the scientific data. And what I'm going to do is I'm going to put a series of images and animations up every time I put one up I will introduce what it is and I'll give you some time to sort of reflect and have a look at the images and then I'll ask you a series of questions related to what you are looking at, I've got four questions for each image but what I will do is put them up together and what I want to do is sort of encourage you to sort of make comparisons if you can, but you don't have to I mean it is open ended, I'm not expecting you say*

SA *Are you expecting me to be a scientist or a human being?*

J *Just whatever you feel most comfortable with*

SA *Should be interesting*

J *Yeh I mean obviously you have got professional sensibilities that are going to come through and that is fine, that is kind of good as well, so as you can see it is split into 4 so we have got aneurism, kidney, sorry arteries, kidneys, aneurism and blood flow and that is replicated on this side as well, so we will start off with the arteries side of things, I keep wanting to point at the screen and not the DVD player, so I'm going to put up this first sequence and I'm going to put up some images that match this sequence here and I will explain what they are in case, just to give you more of an insight into what you are looking at. So just to give you a bit of background of what these images are so you are not looking at them completely blind, the first image straight ahead which is the more scientific image this is an MRI scan image taken from a scanner at Ninewells, magnetic resonance image and this sequence shows cross sectional slices of the head and neck and it is just at one moment in time, so it is not an animation over time it is just a cross section of one moment in time and the areas highlighted I white opposed to grey or black are the arteries that supply blood and oxygen to the brain, the image two on the left hand side the more colourful image is a reconstruction of that same piece of data which has been textured digitally and lit and has alternative*

camera views of the same piece of geometry and the sequence has also been edited into a short loop with the transitions between each sequence, so I will maybe give you a couple of seconds to reflect on those before I ask you some questions. The first question is, please describe in your own words these images and what insight they offer into the human body?

SA *The MRI scan I think you need to be a trained radiologist to really interpret it because it is extremely difficult to work out the continuity between the structures between the individual slices and in fact the more you look at it the more frightening that MRI scan, especially at the beginning of it looks like something out of Donnie Darko it could potentially to an untrained eye be quite worrying actually, this thing has been slicing through your body and also you do have reference, you do have a reference you know where the head is you know where the neck is so you can sort of see that by the time the sequence finished whereas the image on the left give you a much better idea of the blood flow in the veins or the arteries in the neck and I suppose the top of the thorax but there is no visual reference where that is in the body you have to sort of work out that that must be in the neck because based on the shapes on the MRI scan area so, but it depends on what I'm looking is for I suppose, if I'm looking at this to help me understand maybe I have a problem with my neck or my head then the 3D image would be more useful for me than the MRI image but it would be helpful probably to have a reference point about where that is exactly in the body.*

J *Sure, I mean building on what you said a second ago about the 2D image, the scan image being quite frightening the more you look at it, I mean how would you describe the visual qualities of each of the images in terms of things like texture, colour, shape, form, complexity those sorts of things?*

SA *The MRI image is very complex, it is very, fairly flat obviously there is regions of high contrast but there is a lot of low contrast, grey area where you are not quite sure what that is or what that represents so yeh it lacks a certain, it has a certain fear associated with the image whereas the image on the left the 3D image is more pleasing to the eye, the colour you can have reference to, you have association with blood because of its pinkness or it has a certain colour which you think that would be something to do with the body as it is flesh coloured or blood coloured and the lighting and the texture applied to it give you a feeling of, it is organic it is something that you can relate to as being part of, it is visile it is something human or animal you can tell that whereas on the MRI image it could be something computer generated in its on right and something out of a Sci Fi movie, so I think the colour on that, the use of colour and texture and lighting gives it a more approachable feel I think in some ways.*

J *Excellent, this is the third question and in very much you have to interpret this the way you thing, the way you want to but it is fairly opened ended, do you feel that the interpretative image has less integrity due to its abstract nature or more?*

SA *Well I'm not a radiologist but I would imagine that a radiologist might see something in the MRI scan which isn't in the 3D image the 3D representation there even though that is based on real data I'm sure that some bits are not available to the viewer in the 3D image where they are in the MRI scan, having said that what I said at the beginning the continuity, you can't get a fell of a continuity in 3D in the MRI scan slices versus the 3D so it is a play off*

one against the other and it has some benefits for that and some in the MRI scan so overall I would say that the 3 image wins out because the continuity you get between the structures in 3D.

J *The fourth question, as a scientist do you think that the artist has enhanced or diluted the original 2D data and if it is enhanced in what way, you maybe have described that a lot already?*

SA *I think I have probably done that already but to reiterate I suppose you can have a real feel for the, you can trace the individual arteries or veins or whatever they are through the path they go through in the real patient whereas on the MRI scan it is very difficult to do that and interpret.*

J *Okay I'm going to slow things down a bit and we are going to look at some still images based on this same bit of data, just to get, kind of probe slightly deeper into what we are looking at and this is a still taken from the sequence, I'm going to bring up some stills that have a kind of further level of interpretation on my part and maybe have become more distant from the original data, but bear in mind we are looking at these on a kind of aesthetic and arts level and I just want you to sort of, there will be up to four of these at various angles, varying degrees of interpretation, I mean this one is probably very similar to what you have been looking at already but I'm going to just go through them and once we have gone through them I will pause every time we go through one and we will go back, this will just stay the same.*

SA *Okay*

J *I'll just take it back here again, we will maybe pause a little on the abstract one or the one that has the highest level of interpretation from my point of view, this is the second one here. So I mean based on similar questions that we have been through, this level of integrity, visual quality, how would you describe some of these images over and above removing footage that you have already seen, there are things that you want to add that haven't said.*

SA *Are these images based on the moving or just snaps?*

J *They are snaps but then I've added more levels of interpretation to them, I've added in this case depth of field and have drawn the eye to a specific area of aesthetic value I feel.*

SA *So as a patient receiving that image I would be, well it depends if the problem I had, say I had a constriction in a vessel and I could see where the constriction is without any of the background information that was necessary then it would be more helpful, from a scientific point of view I would say that is less powerful to me because I like to see a little bit more of the background, a little bit less out of focus but aesthetically it is quite appealing because you have depth of view, if feels as though you are behind a camera for instance and you have field on the lens so it has affect aesthetic appeal.*

J *Do you think it gives, if we kind of remove ourselves from being a patient for instance and just look at an aesthetic image does it give any other insight into the human body?*

SA *Yes obviously because it give you a sense of depth, a sense of scale and sense of size and that particular image because of the way it is coloured and*

textured it really does look very organic and quite like it has just spilled out from inside the human body, it looks like an umbilical chord or something like that a couple of umbilical chords. That actually indecently I would say is quite frightening those images where you have aesthetically altered them as it were look more frightening than the movie episode as they look like something out of Alien or some kind of Sci Fi so it is quite interesting because the still images I wouldn't have thought the still images would do that but they have some how.

J *And how do they compare to the scan data on the right?*

SA *As I said before there is more information in them and that is a single shot and you are not quite sure the structures that are important in the MRI scan.*

J *So we will move on from the invertible arteries and further down the body as it were to the kidneys. You may have seen some of these images before but they are going to be static there in this instance. Again I'm going to start off with the MRI sequence and then we will move onto the static image from that sequence, so this, I'll give you a description of what this is before we jump into questions but basically this is again an MRI scan from a Ninewells scan patient and these are again cross sectional images taken from front to back and this image was, this scan was performed on the diagnosis of a vascular condition known as rental artery stenosis which is a series condition that occurs when the blood vessels feeding the kidneys become blocked or narrowed due to a build up of arterial plaque and this may result in a surgical intervention by the clinician and the second image on the left is taken from that same piece of data it is one of those kidneys and it is a kind of 3D reconstruction using texture, lighting and fair degree of interpretation to really enhance the data to give a bit more of an insight into structure, so I'm going to give you a couple of seconds to look at those two images. So the first question, the questions are pretty much the same for each set of images just to keep consistency but please describe in your own words these images and what insight they offer into the human body and again I'm keen for you to make comparisons between the two and then we will go onto the other questions which again will borne round the visual qualities of the image, the integrity and whether it enhanced or diluted the original data.*

SA *Okay so the MRI scan is in some ways easier to interpret because I can visualise the kidneys better than I would have thought in that one so I can see that you have two kidneys there and I can see the blood vessel going into them and if I take a step back then again it could be quite, there is quite a lot of visual information going on there, there is a lot of grey which if you compare it to the 3D image, the 3D image is clear is it a single kidney it is taken out of its context to some extent but it allows you to see the kidney and to some degree more clearly so ten if you look at the 3D image of the single kidney and you are doing a comparison, if you look back and forwards to whichever I'm not sure which kidney it is, it is maybe the left one I'm not sure then I suppose it depends what you are trying to look at, whether you want to look at the inner working of the kidney or the size of it or the shape of it or the blood vessels going in and out of it, I guess, certainly the 3D image is more pleasing and if someone had to talk about kidney to me I would rather look at the picture on the left which is the 3D image, from a scientific point of view I'm just trying to work out the relationship between the MRI scan and the 3D image what the different layers of hepacity are in terms of the structures which are present on the 3D, sorry the MRI scan, so I can see that the blobby*

bits inside the shell if you like of the kidney correspond to the black parts I think of the MRI scan, I think I can get that from looking at that but I'm not quite certain and I can see on the MRI scan there is a sort of membrane over the top surround the, and I'm not sure if that is part of the 3D image or not and I can see the blood vessels going in and out, that is quite, in fact that is a lot clearer on the 3D image, so okay my guess is it the kidney on the right then, I'm just trying to work out from blood vessels, so anyway the 3D image is much much clearer in terms of the blood vessels coming in and the structures of the kidney, it doesn't matter so the point is that there is a lot more information to be gained from looking at the image on the left, I think at least to the untrained eye as a scientist rather than a medic and again it is not fear enduing, it looks quite peaceful.

J So it terms of its visual quality

SA Visual quality I would go for the 3D image, yeh, again it is out of context so you can't see, you have only got one kidney it depends on how important it was to look at one kidney versus two or two in context of the blood vessels that are going right the way down and joining, it depends on what you are trying to portray in that image but from an aesthetic point of view I think the 3D image is nicer it is much more pleasing it has more in it.

J And do you fell it gives any sort of greater insight?

SA From the still image is definitely looks as though there would be more to be interpreted but maybe that would need to have the animated and zoomed into to certain parts of it to really fully appreciate the structure because again your mind knows that is a kidney but it is interpreting it as a 3D object because of the lighting but in fact you would be quite like to probe about and have a look at the back of it and underneath it and see what was what and that is something you can't do obviously on an MRI scan you are just looking at a single slice you are not looking at three dimensions of the thing.

J And you feel it has in terms of its integrity do you feel it has less or more the one on the left the 3D baring in mind

SA It depends on how you define integrity doesn't it

J How would

SA I don't think it lessens it doesn't have less integrity than the MRI scan obviously the MRI scan is in a sense the raw data but it is open to interoperation because it is just a bunch or white or grey or black pixels on the screen so your eye must be interpreting it, so I would say it has as much integrity. I don't know how you can say it has got more integrity, how can it more real than the, could it ever be more real, I suppose it depends on what you mean by integrity because unless you actually took the kidney out and photographed it then it is never going to look exactly what a kidney looks like because it is

J I suppose what I'm trying

SA An MRI scan might, you don't know, I mean you only trust the MRI scan to take an absolutely accurate picture but you don't know that for sure it is a instrument which is interpreting the inside of the body.

J *I suppose because I'm adding my own interpretation on top of that, I mean I'm using the data but I'm also adding things that are not real like digital lighting, colour and form and shape and I'm effectively changing the image based on my sensibilities rather than replicating any type of reality so*

SA *I don't think you have taken, well from my looking at it I don't think, something doesn't jump out at me and say you have messed around with that image, it makes it look less like a kidney and more like a part of something, or you haven't coloured it in a way which makes me jump out and say that is an outrage you should never do that to a kidney.*

J *That is really good Paul and I suppose the last one, we have sort of covered it which is as a sort of scientist do you think the artist have enhanced or diluted the original 2D information?*

SA *Enhanced definitely.*

J *And the ways I suppose you have already described?*

SA *Yeh because you think you have got a three dimensional object from a two dimensional but on top of that it is not just about doing a three dimensional structure it is to do with because the MR is an optical slice effectively or a slice not necessarily an optical slice then you can build up three dimensional pictures of the stuff inside and because you have used different opacities and lighting then you can actually see both the inside and that outside and I think that is quite important because it is not good enough just to reconstruct the shell and say this is a kidney because every programme can do that,*

J *Do you think it gives you any other insight though over and above just what the kidney does, what its structure is in terms of 3D, what it means, does it have an aesthetic level of insight that you might want marvel at our own body?*

SA *I think yes I would say that the 3D image certainly makes you feel more comfortable and it makes you marvel more than the MRI scan, because the MRI scan there is a lot of information there and I think probably because of its colour and the way it is very grainy and fairly low contrast quite a lot of it, it doesn't really instil you with a great deal of, it doesn't give you awe, it doesn't create a sense of awe in you when you look at that, perhaps if it was the whole body scanned through you may go oh that is great but in isolation just the kidneys or before just the neck it doesn't give you a sense of that but your interpretation on the left is much more awe inspiring if you like.*

J *Okay I want to just put a still from that sequence up and I want to bring up another image which is the same piece of kidney data but a completely different kind of style and again I suppose to give you some background on this one, it is the same piece of data but it has been textually lit in a very different way and no transparency on it as all and I suppose again we have this question of or issue of, does it give you an insight into the human body and how would you describe the visual qualities and we will maybe go onto integrity in a second, I'll give you a few seconds to. So what is your initial reaction to this and the level of insight into the human body and its visual qualities?*

SA *If I didn't know that was a kidney I would think, I mean you told me it was a kidney, I would have thought it would be maybe bone or shell or some inert object that didn't have any relationship to part of the human body and my guess is that is because of the colour and the texture and also tiny little bits of sort of visual reference to other things you might have seen so the structure on the left which is hollow the jagged edge of it plus the bit above it with a jagged edge of the hole just reminds you of a skull a sheep's skull for instance or some bone which has been bleached by the sun for decades and so if those pieces were removed then you would just get down to a stone or a piece of mineral or something like that so I think your choice of colour and lighting and the way you have textured it gives you an impression of something that is inorganic rather than organic, having said that is someone then said that was your kidney and you shouldn't have this big growth on the side of it then you would immediately say that is big compared to the rest of the kidney so it might in a way be easier to interpret that the previous image which was the semi transparent or lit with different levels obviously throughout the whole structure so in some ways it depends on what your reason for viewing the kidney would be, if it just purely to show a kidney then that would be more confusing to have the image you have just shown now*

J *Do you think? Forgetting that it is a functional aspect of the image is not trying to convey a story it is only a one sided story but in terms of like an exhibition context, how would you value that now, forgetting what it is and where it has come from*

SA *From a purely aesthetic point I really really like it, I think it is really really nice I like the way, I like the grey background I like the colour you have chosen, I like, I think it is just beautiful the way it is composed but that is just purely on the aesthetics.*

J *Do you think based on a continuation of what you have just said Paul the artist has enhanced or diluted the 2D data?*

P *You have changed it, I don't know where you would say it is enhanced or, I think you have just applied*

J *From your scientific point*

SA *From a scientific point of view you have taken something away but it depends if you are talking about gross anatomy or fine structure inside the kidney, if you are looking at gross anatomy and as I say if you have got a huge lump on the side of it that would constrict the vein going into it or whatever that pipe is*

J *It is a renal artery going into it*

SA *Renal artery, then if you have got mass constriction of that then if you have it like a before and after say scenario then you would immediately see the difference without the visual clutter of the rest of the structures inside so in a sense as it is it doesn't tell me that much but I can imagine the scenario where it would tell me more, to have it very simple and very visually striking.*

J *That is great Paul, I'm really ploughing you for information,*

SA *That is quite cool*

J *I'm probably relentless*

SA *Fine*

J *I think we will jump on because I think we have covered loads on the kidney we are going to jump onto another piece of data, again we are probably slowly but surely progressing down the body literally and we are going to look at this aortic aneurism which I will explain what it is, you probably know what it is but for consistency I'll take you through it. So this is the scan itself, so the image straight ahead of you is taken from a CT scan of the aorta which it the main artery that feed blood from your heart, it is a large artery and is kind of heavily pressurised and these are diagnostic images used to detect a condition call abdominal aortic aneurism which is a condition which can be fairly life threatening and it involves a sort of large bulge at the bottom half of the aorta, as it splits in the kind of groin area. The second image on the left if a 3D reconstruction based on that data and we have kind of basic levels of colour but as you can see there is a fair bit of the data that has been removed also to enhance the aorta to bring it out on the screen, so I guess, I'll maybe give you a couple of seconds to reflect on the two sets of images. So the first question is, please describe in your own words these images and what insight they offer to the human body and then we will move onto the visual qualities and integrity and then whether it is enhanced or diluted the 2D data.*

SA *So the scan, the MRI medical scan is or CT scan whatever, is extremely difficult in this sort of vertical scan mode to interpret, I mean you can see sort of where the pelvis is perhaps and the rib cage but it is basically a whole bunch of blobs of grey and white moving through time and you have no way of knowing what on earth is going on so you just have to take the medics, the clinicians word for it in a sense that that what they are telling is the truth and that you have a bulge in your aorta, at the bottom of you aorta, in contrast to the image on the left very clearly it shows, although you would want to have a normal, you would want to able to compare to a normal person that would be one thing because you don't know whether that is normal in a sense you just again takes someone's word for it but in terms of visual impact the colouration, the texturing, the fact that a lot of the data has been removed to allow clarity of vision and you can have visual reference points of the pelvis and rib cage and the spine and say there is no comparison the 3D data as it is shown there is almost infinity more useful especially to the non trained person, but even probably to the trained person, the clinician it is infinity more useful than the MRI scan.*

J *Okay and in terms of its visual quality*

SA *It has high visual quality, it is again as I said the colour contrast, the choice of colours the eye is tricked into thinking there is a three dimensionality, you can see size and scale and all sorts of things*

J *And how would you regard its integrity, because there is very little interpretation in the sense that it is very true to the data that it was taken from*

SA *I would say my impression is that it has got a high amount of integrity because it is not perfect, if you were doing this, if you were looking at a text book version of this you would have something very computer, basically entirely computer generated you would have a very small bulge, symmetrical everything would be symmetrical everything would be perfect whereas you*

can tall this is coming from a real piece of data because it is a little bit rough round the edges and asymmetrical it has real quality about it you can see that.

J *There are a few other images here are from the same piece of data just different camera views*

SA *Do you want me to comment on those?*

J *Yeh*

SA *That one is quite good because it shows the extent of the bulge from the side, the background black is not helpful having it black because the dark red against the black is quite difficult to see, also because it is sliced, the rib cage is sliced it doesn't really help having that there it looks slightly weird it looks like a zebra crossing coming out of the side of the spine, not pretty (laughs)*

J *No, you must be critical, say what you think*

SA *I am*

J *I'm just going to pop up a still because sometimes a still allows you to navigate further into this, and again this is another one taken from, again in the black*

SA *It is okay the black, I think if it was rotating then you would get a better feel but I think because you have coloured the aorta quite darkly and it is a little bit to see but it is still okay you can still see there three dimensionality of it the quality is there and certainly much much more informative than just colouring the MRI scan, say if you coloured coded the bit which is the aorta red or something I still think that doesn't give you as much, well it gives you a huge amount, less information than the 3D image there.*

J *Okay we will jump onto the last set of images Paul, that is good as we are getting through these quite fast, on to this blood flow sequence. Just to give you some insight into what you are looking at here, on the right hand side, the scan side this is an MR image but it differs from some you have seen already in respect that is over time, it is one slice over time taken in the kind of chest area and that is a cross section of the heart from an image performed at Perth Royal Infirmary and the image again shows a cross sectional slice as the heart pulses, it moves in real time and on the left here we have ain interpretation of that flow, so it is not in any sense taken from that piece of data but what it is it is a flow of blood as it moves through the aorta in this case is taken from some scan data and the red blood cells have been added not to replicate reality but to show the movement and enhance this feeling of flow and pulse so we will maybe just left you reflect for a couple of seconds on these images. So maybe first of all Paul just describe in your own words what insight these images offer into the human body and again sort of making comparisons*

SA *Well they are very different types of information that I am presented with so the flow, the image on the right which is the MRI scan at the time is okay it shows you that the heart pumps and you get the impression of some movement of blood from the grey which assumes there is blood in the heart and that is about it, it doesn't really give you anything else whereas the image*

on the left which is the blood flow, the simulated blood flow, based on what you have just told me give you a different sense it gives you a sense of your blood flowing through the constrictions and bouncing off the walls and the particulate nature of blood it is not just a simple liquid which is just squeezing through the capillaries or the arteries or the veins it is actually bits of cell which are bouncing off the walls and for instance if there was a constriction you could then imagine exactly the difficulty the blood would have getting through the constriction or if there was an arterial plaque or something you could image much more readily the effect on blood flow is impeded in certain circumstances so yeh I think it give you a quite profound insight into the flow of blood especially the, not so much that sequence now which we are looking at which is the whole screen is full of blood vessels, cells, blood cells, but he ones where it shows the semi transparent lit artery or whatever it is and the cells are bouncing off the side is a very powerful image.

J In terms of its, how do you feel the integrity of the very interpreted 3D one compared with the

SA I mean the fact is that it is based on real data , the actual aorta or the blood vessel obviously the cells aren't that big and there is a huge amount more to them it is packed full and you couldn't image that you couldn't represent that and I think you have chosen probably about the right number of objects on the screen to give the correct interpretation, they look a little bit like sweets falling down a tube apart from that they are quite shiny and sort of plastic and especially that last sequence there it looks like chocolate falling down through a little bit but once you get the visual reference of the blood vessels then you start to build the picture which is really understandable and certainly the MRI image although it is not comparable because you are not looking at, you are looking at a heart there you are not looking at blood flowing through, you know a side view of an artery so it is no exactly comparable but I think you do get the impression of blood flow again it would be interesting to show differences between, under certain conditions such as reduced blood flow or suddenly you could image simulating say increase in heartbeat where the blood flow would suddenly go much faster that would be quite interesting to show as a comparison.

J Okay and I suppose, do you feel that the artist has enhanced or diluted the 2D data?

SA Well it is not really a comparable data but I would say you probably enhanced it because you get, because you are simulating, okay it is a simulating particles behaving in the context of tube and then the flow but of course it is very very complicated to model that mathematically I mean people are still researching it aren't they because people think it flows in spirals so that, so whether it is, if I was a vascular surgeon or whatever I would probably say that is not exactly accurate but from a patients perspective it could well be enough to give them a sense of what is going on and as a scientists I don't know (laughs)

J And what do you think in terms of its integrity

SA Integrity, well it seems that especially the blood vessel structures have to have high integrity again obviously you have chosen to make the particles a certain size, visually striking, you mean visible and so that you might argue

that is lower integrity than it should be but that is done for a good reason so I think that is fine.

J *And in terms of this kind of, and again in aesthetic in an art gallery context?*

SA *In an art gallery context I think it is very very fine, well because for some people (1) they might not know that their blood is made out of cells or has cells in it they might not know it is particles they might think it is a liquid, the might, they certainly don't realise that when for instance the sequence now where the blood is hitting a junction they probably don't realise that is actually bounces off the walls, but also it is actually visually very beautiful to watch it is very peaceful and calming and it there was a soundtrack of some kind of music then again you would probably stand there for hours and watching it go round and round and round, no I think it is very good.*

J *Okay, we will move on the last set of images now. So we will start with this one or maybe just go through them both but there is two images and there is one image here and I suppose again it is what insight do these images offer into the human body?*

SA *Well*

J *And then how would you describe the visual qualities?*

SA *The MRI image doesn't do anything in terms of describing what the body looks like because the signal noise is very high so you have just got this white band of what you assume to be a blood vessel of some description and then this grey stuff round it I mean it doesn't really do anything it looks like a foot with an arrow sticking out of it, I don't know it is random for me it doesn't make any sense at all but the comparison, it is probably not a very equal comparison to make with the 3D image because the 3D image is fairly abstract it is computer generated, the red blood cells and you do get the feel as though, because of the use of light that they are coming from a source of light towards you and the colours and the textures give you that sense of, that doesn't tell me anything more about the human body it doesn't tell me personally any more about what red blood cells look like because I know what they look like but again it could be informative to someone else, having said that, yeh it is a different type of image so I'm not sure it would be a fair comparison to make between the MRI image and this image*

J *In terms of the 3D image again do you think it has got less or more*

SA *Less integrity*

J *Less integrity the 2D?*

SA *This particular one shown which is the, if you have shown one of the other ones I would have said it would have equal or more integrity if that is helpful?*

J *And the second one, maybe how would you describe it in its visual qualities?*

SA *That would have, that has more integrity because well at least equal integrity you have the vessel texture, you have a certain colour coding in some extent, you have some other structure in there which you assume to be part of the body which I don't know anything about but it is a visual reference point, you*

have got, you can see another vessel joining the bigger vessel which is constrained at the junction where they meet and that sort of is quite striking to me the blood cells look a bit flat and some slight weirdness with the sizing going on because from a perspective looks wrong, the red blood cells on the left look to be larger than the ones on the right yet the vessel doesn't seem to be, it is proportionately smaller on the right compared to the left so I think there is a perspective problem wit the

J *And how would you describe its visual qualities generally and aesthetically?*

SA *I like it it is quite intriguing there is a lot to look at*

J *What does it make you think of?*

SA *It makes me think of a landscape, it actually makes me thing of sort of flying over some planet or something in another galaxy where they have got these little red things floating above the surface, actually yeh it is interesting. Something quite surreal.*

J *And in terms of its integrity due to its slightly abstract nature how do you feel do you think it gained integrity or lost integrity?*

SA *Well gained it in some ways and lost it in others, lost it in the fact that the perspective issue on the cells is irritating me but they fact that you can see the vessel and you can see the joining of the other vessel the bigger vessels is quite nice I like that it makes you feel it is based on real data because you wouldn't choose to do that it is not idealised vessel but two arteries joining it.*

J *Do you think the artist has enhanced the original data or, it isn't made from this image it is made from the kidney data*

SA *Well potentially enhanced it because I can imagine that the original data was probably very difficult to interpret basically looking at the MRI data was shown previously on that one so I would say probably enhanced, probably on balance it enhanced it.*

J *Okay, cool well that is the first part over, that is the hard part, this is the easy part.*

SA *Okay*

J *So I've only got a few more questions but we are going to spend a little more time just chatting and I'm going to move this microphone over. Maybe if I just explain a little bit about this sort of second part to the experiment and this is much more opened ended and discussion based but what I have got here is more about the origins of where the images come, because again this experiment is related to integrity so maybe if I just walk you through what is here, these are kind of props that help us compact a little bit about the questions I'm going to ask you but in terms of forming a lot of this imagery in terms of how I build the stuff a lot of the interpretive content doesn't just come from purely just my imagination but there is lots of influences and it is whether those influences have degree of integrity or have a value because they are certainly not scientific in the respect that you might see them from a science point of view, I mean in terms of colour and shape and form and position I use things like references or they may be historical references and I this is a*

sketch, which may be of interest, the image which you saw which was kind of light based and this one here has been influenced by the lighting because it is a sort of starting point so that is one aspect that kind of feeds into the work but also just where you hand is there is a certain degree of tooing and frowing to the medical team which includes things like where these particular types of vessels, diagrams and drawing for instance and then there may be emails that come too and fro just to describe where bits and pieces are and then obviously I used the traditional way of basically learning the anatomy and trying to use kind of reference points and also looking how other artists approached things. So that maybe give you some insight into the how it is developed. Maybe I could add as well that this work is trying to build a completely interpretive heart image but does that give a nice scientific value if it is completely driven by my imagination in some senses I mean obviously I have pulled from references to build this.

SA *So you would build this from scratch?*

J *But I've obviously used some of this and my experience so I think what I'm trying to say is does that give, if the data is visualised not from a scientific point of view as in say like a geometry to start with has it lost its integrity or has it gained another type of integrity because I have an understanding of*

SA *I think as long as you are very clear about what that represents, it the patient saw it and knew that wasn't their own heart it wasn't real like heart then it is a model to show how it beats, and if you are using that to illustrate something is wrong then for instance then I could see would be very powerful and it doesn't matter that it is, because you have modelled it on ??? so it is a model for identification so it is a realistic model but scientific fact.*

J *Okay I mean this is another example of abstract input and this is for example an image that I took in New York in the Natural History Museum but then back when I achieved that next piece of work so again these are pieces that are being presented in a scientific context but they are very much very art space influences to help people navigate, there is a discourse in language that is being used in the work that you have seen that isn't necessarily buried in the sciences unfortunately it has moved so does it change its integrity, so I've give you a little bit of background of like the profess or the origins of how the images were produced although you probably knew all this together because we kind of work together but if I can ask you these last four questions Paul just based on the continuation of this and I've got this blackboard because I want to draw a couple of diagrams and get you input on what you feel based on your own, so the first question is, do these images affect the way you think about your body, I stuff that you have seen has it affected the way*

SA *Yes, I think it has because well there is two things the MRI scans in their own right give you more information about what you body looks like but as we talked about that is really incredibly difficult to interpret and so seeing the images and the blood flow and the aortic aneurism and the kidney all of those 3D interpretations you made enhancements give you a lot more insight into the three dimensionality of your body space and just thinking looking at those images now especially the neck the Venus stuff in the neck that is really striking because you realise how complicated and interconnected the veins are it is not just a simple couple of veins going up the side of you neck into your chest so that is very very interesting and the kidney again trying to work*

out what the inner space is and the outer space is and how the vessels come in was rally interesting, and what else did we had, oh the blood flow, yeh I really liked the blood flow they way that you see the cells bouncing off the walls and how they behave when they hit a junction that was quite interesting for me.

J *Third question is sort of a general question or second question not third question, what would you define as visual integrity in your own practice?*

SA *In science then you have to, for publications you have to be accurate so you can't*

J *So accuracy is probably*

J *Yeh you can't change anything other than in a predictable and defined way and you have to know how you have done it*

J *It has to be a recordable process?*

SA *Yeh, reproducibility, you can't have ambiguity you have always to be aware that the reader is making a judgement on your science based on what they see so that might be a graph or it might be histogram but it also can be a visual image of a cell or even I guess of a tissue slice for instance and something like that and you have to always portray it accurately and you absolutely have to be rigorous and make sure you don't alter that to obscure the result and obviously there are well known cases where it other papers where they have done that and obviously it is fraud.*

J *So ambiguity isn't really a sort of*

SA *It is something that you avoid at all costs.*

J *So integrity is sort of in your field is based on a sort of clarity and reproducibility?*

SA *Yes and in a sense, well what do we really mean truthfulness in the sense of the artist sense truthfulness but as close to the observed truth if you see what I mean as possible, okay that is not the truth because it is always an interpretation but it is not removed too far from what you originally saw when you looked down a microscope or whatever.*

J *And I suppose what role do you feel the artist should play when working with medical scan data?*

SA *Well*

J *I will maybe help you out here in terms of words that have been used in the past to describe to things like, illustrator, translator, mediator*

SA *I think they can be all of those things because you are illustrating something because you are adding a layer of information which isn't there already so you can't away from the fact that you are illustrating because my interpretation of what illustration it is that it is another visual, putting down on paper or film or digitally another layer of information that isn't there already or reinterpreting it in a way which allows the viewer to see something that they*

didn't see before but that also can be interpreted as being a mediator or a facilitator or whatever the second word you said

J *It was translator*

SA *Translator so you are, so in a sense a traditional illustrator in a book like you showed over there it is still translating the information that they may have gleaned and even though it is old historical things where they observe the patient stripped out and Leonardo's very careful drawings they are still, they are illustration because he is using his eyes to put down something on paper and he is mediating, people haven't done that before so he is mediating he is translating what he sees with his own eyes into something which is stuck on paper so there is this whole big debate isn't there about what an artists is*

J *Well exactly that is what I'm trying to tease out that from your perspective, I mean you have probably got the benefit of hindsight because you have worked with artists before so you know that it can be very kind of, it is a sensitive issue almost*

SA *Exactly but I don't think there is anything wrong with at least a element of illustration because I think that, but I think that it is a dirty word and for me illustration means something more like as text book definition of what an illustration is rather than an illustrator which is someone in the artistic field which is maybe just slightly a bit removed from the artistic interpretation but I think what you have tried to do and I think you have succeeded if you have added a whole new dimension to the data the raw data because in the sense you have done what Leonard did when he sketched the insides of the human bodies you have done something, or tried to something and I think you have succeeded in adding an extra dimension and not just in 3D but also in time and also in aesthetic quality.*

J *Do you think it is about context as well?*

SA *Yes, I think it is.*

J *I mean in some ways ethically and in terms of kind of appropriateness showing patients slightly ambiguous imagery could be see as unethical and often could be offensive in some ways to showing something in an art gallery space that general viewing audience who want to just a get a feel for what their internal body spaces are about and deal with much broader issues*

SA *That is two questions, well yes so what you are saying is that the patient shouldn't , I suppose in the sense that you are mediating for the patient you are actually mediating.*

J *If you take a couple of examples like the image that had quite a lot of depth of field in it that is fairly kind of abstract and it looks beautiful but it doesn't really tell much about the disease process so*

SA *No, right*

J *So obviously for it to be used in the context of patient communication it would fall down or it could do but in the context of a ?? down in the art scene then we are looking at it in its terms of its beauty and we want this to say more*

than just how it functions so there is this kind of fine artefact shifts context it somehow has to do different things

SA *Absolutely definitely I think that is true I think that is absolutely true because it is like the extra added dimension of sound the patient does necessary need to see, have a nice sound track on the back of it but somebody in an art gallery that might want one, there is all sorts of add ons you can make so I would say that it is context dependent so sometimes it could be purely erring towards illustration/facilitation of understanding and other times it might be really making you think about what your body's space is about or you could throw it out into the artistic sort of world.*

J *I suppose it is this sort of struggle between visualisation and representation there is a very kind of different objective process. On that point this is the last sort of part to the interview Paul because I want to make use of this board and we talked about a couple of issues that are really quite important but I'm really interested how these can be represented because it is easy to use dialogue to discuss these issues but how can we physically represent them in a graphical sense because that is the way visual thinkers work and it is sometimes easier as well to sell an argument when you can visualise it in terms of diagram and that is what I'm trying to do with my own work and I will just draw two diagrams of the way of describing what I do and them and maybe you can agree or don't agree or add your own one, which is what I'm really trying to do, so this is kind of two not hypotheses is the right word and one a sort of linear point and you have almost like spectrum on interpretation and at on end you have got scientific data you have got the science end of things and you have got the*
MRI scan that like you say fit into these reproducibility this authenticity

SA *Anticity that you require for it to be peer reviewed and to stand up*

J *Yeh and at the other end we have very much the arts and we have some slightly more abstract images that are and in fact I would even say that I think some of the images I've produced don't even reach that yet*

SA *I was going to say, they are actually somewhere between the two.*

J *It is because I embedded them in the scientific data but you have got the other end you have got some of my work populates this end because it is quite close and these are the type of work that is shown to patients I think in that sort of region here, and then this is the stuff that is a C type scenario but that is kind of very linear and not in the context of where is sits so another way of describing it is a sort of zone and in the middle you have got a sort of central part and this is the content bit and this is the arts content and the a science content, I say science but what I mean is almost like clinical usefulness in a different way and that have got a central point in the middle and then you have got cross over and then you have got the images populated at different points to this context and some images, but maybe what I'm trying to say is how do you feel both these diagrams describe and how would you say the work sits and if there is anything you would*

SA *Well they are both the same diagram actually because you haven't, there is no, well in some ways the linear diagram is more appealing but that is maybe because of my background. That one I'm not sure what they conveys because that looks like a Venn diagram where you basically have equal*

distribution of information in each of those two zones and the overlap is where there is a commonality between the two but you are trying to say there is a centre point where there is an high intensity of artisticness which then becomes less intense and there is a higher degree of scientific integrity in that side and that dissipates and the only where there is low integrity and low artisticness that they coincide which isn't so if you scrutinise that more I don't think that holds up, because if you look on the side and what I see you saying is there is a sense so it is like an egg shape and you have another egg shape on this side and that is the high the two peaks and the overlap is where you have low artistic and low scientific research which is not necessarily true because you can have both as you have shown you can have high scientific content or high reality content but also highly artists or highly aesthetically pleasing so how do you draw that

J Do you think this needs a Z axis then?

SA Well you could do, you could have, this would be your heart here and you could have science here

J Context

SA Context but then how would you draw the shape lets thing about this, em lets think about this if you go about this in a mathematical way it is making big assumptions, it is too simplistic to put it into a sort of axis type it is too, you can imagine someone with high artistic or integrity or could be very, well that is what I like about this is that you have got this defined end which is a complete abstract and you could actually re don this and say the whole of the heart goes from the very real to the very abstract and some artists are very abstracted and some images can have both or more abstract in it

J I suppose you could argue that when you get things in harmony I mean this could be form and this could be function no the other ways round, no this would be function and this would be form

SA So say a piece of furniture which is like a design classic where do you place that

J That is what I mean you could have completely like, there is something that becomes abstract completely unfunctional

SA Yeh it is a beautiful chair but when you sit on it it breaks or it actually doesn't function as a chair as it is really uncomfortable

J But you can get design classics like a Marcel Brewer which has a certain degree of abstraction

SA But it is a really comfortable and really well designed chair

J It is a kind of classic and where does that function does that function on this middle ground does that function on it own in the middle you couldn't plot it as a graph you could plot it as like a, it kind of goes up and then suddenly drops off, somewhere in the middle there is a sort of utopia as you get,

SA This is like over design?

J *Well if you use my images again you have got like Graham said I want an image that tells how the heart beats so I can't go too far away from the data and then I go further and further away and I use obscure camera angles and it is kind of quite beautiful in its function but it is not far off the way that you can't understand it*

SA *I think they kidney falls into this area here*

J *But what I was thinking was that what happens as this doesn't have much emotional value there is very little emotional value here these three points you have got something that is very religious to its scientific data but does it have much emotional value*

SA *Context, if you have this idea that someone is getting excited or dying of a heart attack or you have got some other message point that is saying there is some issue here which is not just a simple illustration it is showing some ?? so maybe you can have emotion attached to it but that doesn't necessarily say that it has got intrinsic emotion*

J *We are probably making really large assumptions and if we move it right back to the context I think the context seems to be the sort of consistent thing it is where it is delivered will affect its emotional level*

SA *I think that is true, lets face it if you had a really really great chair that was classically designed and really beautiful to look at you wouldn't put it is a cafe with a whole bunch of workmen coming in and sitting on it with their dirty clothes*

J *But in the V & A it would be completely perfect*

SA *Exactly so it is where you place it and its value, it is the context I suppose emotional or value but not real value what can I say context, your values, it is to do with values and I think you value this as being beautiful as a chair so do you value this as being an object which you can sit on and be comfortable*

J *So you would say the context is quite important but that affects it emotional, value and probably this case its integrity?*

SA *Yes because going back to the chair, I don't know why I latched onto that but it is actually quite good*

J *Well that is quite interesting because you are absolutely right because integrity has to, how do gauge integrity you gauge it by a set of rules a set of values which is like what you have got for your journal submissions*

SA *Exactly just like the art world, I mean the art world has a set of rules that everyone has to obey by and even the most whacky artists can have rule applied to them and say the public doesn't like it and you won't get anywhere or the art establishment doesn't like it because it is either too old fashioned or too X Y Z everyone has a value system but that is a bit difficult to interpret that I mean the Venn diagram thing but you could have a combination of the linear and the two dimension rather than just the one. I think you are right the question is why does it have to be that shape why does it go*

J *I suppose that is the context, the value rules as we are saying okay its effectiveness with patients so its effectiveness versus interpretation for me so the more I interpret it*

SA *Right it is totally context depended*

J *This all falls into the context so that you could almost have two separate graphs with two different contexts*

SA *Because if you think about it, I don't know who you interview but if you interview somebody else like an abstract artist they will probably hate seeing the raw data and love all the more, they probably think your most abstract is not abstract they see it as something very much based on the art so it is all relevant a theory of artistic scientific relativity*

J *Write it up there Paul, well that has been great Paul*

2.2. Physicist A

Interview with Physicist A
Date: 17/10/06
Time: 11:15
Duration: 1:30:05

J *There is four sections to the screens, arteries kidneys, aneurisms and blood flow, now each screen is split into sort of two categories like this screen is the science details they are MRI scan data it is very much the diagnostic work that you see day to day, on this side it is all the 3D visualisation work and what I'm going to do it put up two sets of images one each screen, one image on that screen and one image on that screen and get you to make comparisons between the two, so there will be one scientific image and the there will be the 3D data that, the 3D visualisation that I've produced that relates to that stuff. So we will probably just bask on with this Steve if you are all right?*

PA *Yes*

J *One thing I'll add as well I've give you a couple of seconds to look at the images so we are not asking questions straight away you have a short break maybe 10/20 seconds just to reflect on what you are looking at and if you need longer just say. So this first one is the vertiral artery and I'm just going to put this one and then the second one and then I'll explain what they are, I think you will know what they are. So the image straight ahead this is an MRI scan taken at Ninewells and it is cross sectional images of the head and neck area and as you will be aware Steve the area highlighted in white is the arteries that supply the brain with blood an oxygen. This second image is the same piece of data that has been reconstructed and I've textured it, digitally lit it and used alternative camera angles to pan round the geometry, the sequence has also been edited together in a series of short animations and it just runs on a loop. I've just give you a couple of seconds just to view. So the first question Steve and again they are very open ended questions and there is not really any right or wrong answer but questions one is please describe in your own words how these images provide an insight or offer an insight into the human body and I encourage you to make comparisons between the scientific imager and the interpretive imagery. Maybe if we start with the scan data, obviously from you professional point of view what insight does this particular scan data give you?*

PA *I find the 3D MRI based data reasonably clear on the basis that I've worked with 3D a bit before anyway and I think the addition of the anatomy that surround the vasculature that assists you identify where you are the contrast is pretty good but then you are only seeing small bits of vessel information per slice so obviously that is a disadvantage, my first thought would be the contrasts is quite good but the anatomy that sounds the vasculature is quite helpful actually from my point of view. The 3D looks visually very impressive but I'm not really an anatomist and I wouldn't unless I was to compare it with a diagram or a textbook wouldn't obviously know where I was I don't think but*

I think if you had an area of disease and there was an obvious kink in a vessel that would be quite informative relative to the MR data, probably more.

J *Second question is how would you describe the visual qualities and I think you have kind of alluded to it slightly in terms of your initial reaction?*

PA *Initial reaction I think visually the 3D visualisation, your data is a lot more impressive but from a kind of understanding point of view I can get a bit more out of the MR data the base data I think.*

J *And in terms of kind of visual qualities how, when you say visually impressive what aspects, how would you define those sort of attributes because I obviously you define a little bit about the attributes of the MR, you said the contrast was good, there is some sort of reference point to the anatomy what aspects of the 3D are allowing you to make that sort of assumption?*

PA *I think the use of colour is quite visually attractive for me, the surface shading, there is just the whole sort of 3D feel but it is quite appealing, you are getting probably more out of it than you do for the MR data because obviously you are looking at images and the MR data proportionately lower resolution so what you are interpolating is very different.*

J *Okay the third questions Steve is, do you feel that the interpretive image the 3D image as obviously there is a degree of interpretation because of the lighting and colour not necessary how it would actually look although it is maybe the geometry is relative it is based on the scan*

PA *I have actually thought about this question before and if you go back to the MR data actually that is in some respects subjective because the imaging parameters that you use to generate that base data will influence the actually appearance of the base data quite significantly so who is to say that is the gold standard essentially and so that is a sort of visual interpretation as it is anyway. For the 3D data I don't think I can answer it because I don't really know what steps have gone into forming it, there is an element of perhaps personal subjectivity whereas with the MR perhaps it is a little bit more, it is a bit more constrained but there is a degree of subjectivity in there I would say, radiographics are put in the top of the contrast etc etc.*

J *That is quite interesting, so basically although the parameters are reproducible in some respects the machine produces this image from, in some ways there is a degree of all interpretation because you have kind of set those and who is to say that they are the right one?*

PA *Correct, who is to say you are using exactly the right sequence, a different MRI sequence and you would end up with a set of images that would look really quite different and it is all about optimising your contrast between the vessels and the surrounding tissue.*

J *So it is a very much a craft process through experience and skill, you are almost a bit like a photographer you are trying to get the best out of the lens and best out of the film or whatever?*

PA *Yeh and I mean it is known for example that certain MRI sequences will highlight errors of blockage or stenosis, over highlight them so when you compare the MR data to anatomical reality sometimes you get*

misconceptions between the MR and reality anyway but I have to say comparing the two that I would feel more at home looking at the MR data as a representation of reality in this instance.

J *That is really good and as a sort of clinician/scientists Steve what do you thin, do you think the artist has diluted or enhanced the 2D data and if you feel obviously it is diluted or enhanced in what way is it diluted or enhanced that piece of original data?*

PA *I think it is definitely enhanced I mean it is very pleasing to the eye I suppose to see all the vessels within one image essentially a 3D surface rendered image I suppose, what I fell I find difficult it identifying where the anatomy lies relative to all the structures I suppose but that is partly because I'm not clinically trained to recognise these things.*

J *We will move on to, again still looking at this one scan, I'm going to just show you another and just jump to it, I'm going to show you a static one of the same image, so slow things down as I feel that the movement does slightly overpower things at times, so I'm going to show you a set of stills that I've produced from this data, now they are kind of similar in many ways to the 3D sequence that you have seen but they are static and they have some degree of abstraction to them and not necessarily about communicating the obvious kind of disease process but they are quire pleasing images, well in my opinion but would differ from someone else's option but just trying to get you to talk a bit about, and I'm just going to scroll you through them, there is three of them and then I'll take you through each one of them and then we will pause on one. I'll just go back through them and I'll just pause on the first one I want to talk about. So again I'm going to ask you kind of similar questions Steve and obviously feel free to make comparisons because that is often a good reference point, please describe in your own words how these two images respectively give you some sort of insight into the human body and then maybe we could go down and talk about the visual qualities of each one and then their integrity and whether they are enhancement or dilutions of the original data, but if we maybe start with this one, what is your initial kind of reaction to that one?*

PA *It is very pleasant, a very pleasant image, are you able to tell me the anatomy?*

J *Well it is basically the same thing it is a 3D construction of the vessels that we made from the scan it is the vertribal arteries so the spinal chord goes down the centre of that to the back of the brain*

PA *So that is an area at the back of the brain?*

J *But don't worry too much about what it is although maybe you feel that was linked to how you interpret it but how do you feel in its sort of texture, composition, structure, symmetry?*

PA *I think in this case I prefer the 3D to the baseline MR, looking at the baseline MR it is kind of difficult to know whether or not there has been some sort of movement within the image anyway from a sort of scientific point of view there may have been a slight misalteration there and there is not a great deal I would be able to interpret from that particular, that is one example of a 2D slice but that sort of gives you, the 3D gives you more of a depth, much more*

of a depth feel and even without the movement and rotation I still find that, I probably find it easier in some ways because it is keeping still and I think with a little bit more anatomy surrounding it to give me a better orientation I would definitely prefer that, yeh.

J *Do you feel it has, because it is an interpretive image and it has certain degrees of depth of field to it and it does have a slight abstraction to it do you think it add less integrity or more?*

PA *I think the 3D image from, it is clearly drawing you to the structures that are in focus at the front and I think the idea of that is great if that is what it is intending to highlight then definitely, the structures at the back would probably give someone a better clinical idea of the anatomy, a sort of locator really, it is not enough for me to locate in this instance but it certainly would help. I think having something in the foreground which is focused and something that looks to have a depth of field and looks to be behind it is quite useful.*

J *So you think, I suppose it is a continuation of that, the artist, in that case me, has enhanced or diluted the original 2D data that this is built from baring in mind I have used the high contrast areas to develop it?*

PA *I think it has enhanced*

J *Do you think it has just enhanced it aesthetically maybe not structurally just visionally*

PA *Yeh aesthetically I think to make alterations is this particular case and in the case of looking at somebody with ??? to make structural alternations is bad news really, I don't think I would be able to say that there is a significant structural alteration but definitely aesthetically it looks*

J *So I'm going just to jump on to the next area Steve which is your area of personal interest which is the kidney. So I'll start with the MR slices again and I'll give you just an intro as to what this is but I'm sure you will know well what it is. This is an MRI again taken from a scan at Ninewells Hospital and these are cross sectional slices taken from front to back and again these are cross sectional slices made in one moment in time so this hasn't any time lapsed there is no time aspect to this so it is not really an animation as such just scrolling through like slices of bread, the scan was performed in the diagnosis of a vascular condition called renal artery stenosis this is a serious condition that occurs when the vessel feeding the kidneys has become blocked or ?? due to a build up of arterial plaque this may result in surgical intervention by the clinician and on the other hand on the left screen this is a piece of reconstructed data from this renal scan which has been digitally lit and using 3D visualisation techniques transparency has been added to give some insight into the internal structures of the anatomy, so I'll give you a couple of seconds and then maybe we will jump into the questions, the questions are the same again for consistency across each sets of image so, we will start with the first, please describe in your own words these images and what insight they offer you into the human body, and again maybe make some comparisons between the two?*

PA *This one is closer to call actually, I think previously I preferred the base MR data but this time I think with the fact that you have got a really obvious anatomical location it is not scripted just to vasculature you are actually*

looking at an organ as well, it is easier for the, I would think it much easier for the lay person to understand what they are looking at and the 3D visualisation is very clear and to me mind represents the areas of the kidney that I understand from my work anyway. The MR data shows quite nicely the renal arteries, given that you are talking about looking at renal artery stenosis I think that is quite a nice set of images but again that is probably because I'm used to looking at MR images. Having the arteries and the kidneys all visible admitantly as you scroll through the data set it helped me out quite a lot there. The 3D is excellent of the actual kidney itself, I'm less convinced about the artery but I don't think that is designed to show the artery, looking at the kidney yeh, it is clearly got the structure that I'm aware of, ?? regions and the ?? regions collecting ducts.

J *And how would you describe the visual qualities of then Steve in terms of I suppose it is difficult for you to remove yourself from the kind of professional*

PA *Again the MR pretty grainy low resolution image and the 3D image is visually far more appealing, much higher resolution by the looks of.*

J *And do you think that the integrity obviously there is a certain degree of interpretation in that kidney where is has lighting and structure, the structure is true to the scientific data in a sense but obviously all the other attributes that I've added are not necessarily a representation of reality which is the reality that I feel highlights the structure. Do you think that provided an integrity that is different or more than the original data that it came from?*

PA *I mean the normal data, sorry the original data where the constrastations that are taken me are telling me that is areas of contrast in the kidney they would be able to interpret that from the 3D data but that is I think because I know the background to why we inject the contrast and it is a bit of a difficult one to answer that actually.*

J *I suppose the MR data again it falls into this process of interpretation that it is a kind of, it is a flow diagram or it is the flow of blood through these organs and it isn't necessarily represented of anatomy because obviously blood doesn't get there is doesn't show on the scan but it doesn't mean that the anatomy is not there?*

PA *That is correct it is a sort of functional, it is almost a functional representation because if that particular set of MR data was collected 30 seconds or a minute later than it actually was then you would end of with a completely different image of the kidneys themselves, you couldn't see the arteries so clearly the veins would be obscuring the arteries and so essentially it is an important aspect of the MR*

J *Do you think as well when you sort of navigate through that image as a non trained professional like me, I suppose patients fall into this category as well they assume that is reality, that is reflective of what is there, because it is a scientific image and so it is seen as that sort of higher, it has a higher degree of integrity or authenticity because this film, this reproducibility model, you know what I mean.*

PA *I would say from a completely stand away from the science aspect if I was a patient and I wanted to see what my kidney looked like I would probably be more inclined to be sort of more interested in the 3D definitely because it is a*

more interesting image and it has segmented out the kidney again the fact that you don't have anything surrounding it means that the kidney is the focus in the 3D. In the MR obviously there is a lot of peripheral information which is going to distract any observer I would think whereas with the 3D visualisation there is absolutely no doubt that the person is looking at that basically.

J *Cool that is really good Steve. As a clinician/scientist Steve do you think that the artist has enhanced or diluted the original 2D data? Or does that depend what it is for*

PA *Yeh I think in this case from visually interpreting the structure of the organ I think it is enhanced because you have got a much better shape for the organ, not entirely sure about the inner structure but the general shape and the overall dimensions it would be much easier to understand than the 3D definitely.*

J *Again I'm going to do what I did the last time an d put up a couple of static images, so this us just a freeze frame from that set of images so that we can just slow things down a little bit and I'm going to spring up another image and again this is taken from the same piece of data, it is a three dimensional visualisation it has been textured and lit in a very different way for reasons that may not be specifically about conveying structure or disease process but maybe trying to communicate other underlying issues related to the body spaces. Maybe if we just go through this kind of again these sort of structured questions, what insights first of all does these images give into the human body and more importantly and I think it is more prevalent in these two images how would you describe the visual qualities of these images? I mean you may have covered a lot of this already in the last images so don't worry about, if you feel you have covered it then you don't need to say it but obviously this one you haven't seen so maybe talk a little bit of how it makes you feel and how you are trying to place it and what you thoughts are?*

PA *My thoughts from the 3D point of view is that the image is still really quite nice because it gives you again a clear 3D interpretation of the dimensions and the shape of the kidney, I think probably the lay persons impression of the kidney is that you organ should be kidney bean shaped essentially and I think that the 3D really give you the feel that is the case. The internal structure obviously is not clear in this case and whilst it does look pleasant I think from the point of view of representing reality my interpretation of this latest image which would suggest the surface would make be confident that that was representing the real shape of the kidney externally. Again the MR data I've already said pretty much all I can on that, the shape is reasonably well identified by the way the contrast has been taken around the cortoral regions of the kidney but again that is to do with the timing of when you acquire the image.*

J *Do you feel that the interpretive image the image on the left has kind of less integrity due to its abstract nature or it non reflection of reality?*

PA *Not really no I think it is a very pleasant image actually it is kind of simple and effective, simple perhaps not the right word but effective, from the shape of things on the basis that if you were using something like that as an educational tool it would basically deliver less confusion I think.*

J *As a clinician/scientist Steve do you think the artist has enhanced or diluted from the original 2D?*

PA *In this case enhanced yeh, it is a much more recognisable area of the anatomy than the cerebral vasculature to me and it might be a representation of that I might need to gen up a little on my cerebral vasculature*

J *No that is fine*

PA *But I think it is more recognisable definitely.*

J *Okay great, so that is the kidneys so we are almost have way through now for this part of the experiment and we are going to look at an aneurism and some data I've been working on there. It is great that these menus are really slick but they also very time consuming to go through. So I'll bring up, there are three aneurism images and there is one sort, they are actually taken from CT, they are not MR so again it is a sequences of slices and just to give you an overview but you will be aware of these things already Steve, but this is an image taken from a CT scan of an aorta, the main artery that feeds blood from the heart these are diagnostic images that were used to detect a condition called abdominal aortic aneurism, a life threatening disease and it causes a bulge in the bottom of the aorta, this is a reconstruction of this data but with obvious deletions, colourings and a front perspective camera view and I've added some basis interpretive colours obviously it does not have the kind of, reflective in a detailed resolution of the previous images it is much earlier on in the interpretive process but I think it is a good one to show, so I'll give you a couple of seconds to reflect on that Steve and then maybe we can go through, so I guess the first question again well the questions are the same for each one, please describe in your own words these images and what insight they offer t the human body and then secondly what visual qualities or describe the visual qualities of these images?*

PA *I mean starting with the CT data effectively looking at a fly through transverse, I can visualise where it is the aneurism but I would expect somebody who wasn't used to looking at abdominal images of the human body would have quite a bit of difficulty finding that actually. The 3D visualisation is great to my mind this time because you have got quite a bit of unobtrusive supporting anatomy that helps you located where you are and seeing the vertebrate for example really helps you to locate where you are. The aneurism is pretty obvious but from looking at the two comparing the transverse fly through on our data and the interpreted data my first impression is that it is a very good representation of what is there. It is a very nice one.*

J *And in terms of the visual quality of it doe you think it, obviously it doesn't have the level of rendering that the other ones have but does that affect the way in interpret it? or does it possibly give you an easier way*

PA *I don't know, I think, I find when I first looked at it my first thought was oh yeh I know where I am now, visually again the use of colour you have got the representation of the colour reddy/brown to represent an artery or blood which helps because I suppose your brain automatically assumes that is what the colour would be, I'm not entirely sure whether it is, em the sort of yellowy bone marrowy type colour is not obtrusive but it helps out to have it in the background as a nice sort of landmark a lot of use of the colouring*

J *Do you think it has enhanced or diluted the 2D data?*

PA *Oh it has very much enhanced it, nice one.*

J *And do you think it has got less or a more degree of integrity? Or does it have a different type of integrity to it.*

PA *I think it is different but I would feel pretty confident that looking at 3D data that I would be looking at something that represents the scan, it would be very interesting to know how both of them represent the true anatomy which could be a big problem*

J *Good point*

PA *It is always what is your gold standard, and I suppose the gold standard is the true anatomy.*

J *Doing a cross section*

PA *Yeh what is the gold standard sort of thing*

J *That is a good point because they are all degrees of interpretation nothing is actually a kind of true truth so in respect is it. These are just more images again of the same thing but obviously a slightly different background from a different view point I don't know if you want o add anything, you have said a lot already on the images but if these provide any additional information or visual kind of qualities*

PA *I think in this one the spinal column is really nice and it helps out again giving you again the landmark relative to the aortic aneurism, I'm not entirely sure about the ribs they don't add anything to this particular angle so I think the angle dependents as the chord leaps out and appears much more to me in this one but the peripheral bony structures are now less important and I can't really get anything out of what would have been the pelvic area which was really clear on the other one so I think the angle at which you have displayed the interpretative data is quite an issue in this case actually, it changes, it still looks good but it is just.*

J *And this is another one without the grey background.*

PA *This time I can, as a sort of a lay person I suppose I would get a lot more out, I mean that looks to me now like a normal rib cage would do, in the right position and I think the pelvis area looks to me to be a pelvis although you can't actually see the spinal column too clearly, it still gives you a good location of where you are and just tucked in behind the aneurism and that to me as a sort true corona view I suppose of it were a 3D corona it really looks good, yeh I prefer that to the previous one even though the imagery of the spinal column in the other one looks very very nice.*

J *Okay great, that is really good Steve and I suppose jut to cover the questions that I didn't cover with you was looking at these three images collectively these 3D images would you say that they have less integrity due to the slight abstract nature although they are fairly kind of descriptive or more integrity?*

PA *I think they are kind of quite individual cases actually, it is quite difficult to generalise, out of the three my order of preference if I was to look at the 3D data relative, sorry the interpretative data relative to the, based on imaging data I like the third set, the aneurism set is the best, the kidney second best and*

J *Sorry I don't mean the whole thing I just mean these three images in the aneurism set.*

PA *Beg pardon, yeh they improved things, they definitely improve my understanding of what I should be looking at, had I not known what an aneurism was prior to looking at these two images the 3D data would have told me what it was quite explicitly but the fly through based on CT data wouldn't have really told me anything had I not know what it was.*

J *And do you feel that obviously as a clinician/scientist do you think the artist in this case has enhanced or diluted the 2D data that I started with?*

PA *Definitely enhanced it.*

J *And enhanced it in a way of better describing what is there and giving an insight into the disease or just generally giving you an aesthetic or both?*

PA *Both, definitely both I feel had I walked in off the street and had been told I had an aneurism I would much prefer to see the 3D set in this case.*

J *I want to show you some animated stuff now, some of which you have probably seen already. This is the last section blood flow. So this is straight ahead as you will probably know Steve is an MR image from an MRI scanner at Perth Royal Infirmary and these images are a cross sectional slice from a pulsing heart and this is different from the MR images as it is taken across time rather than one kind of one moment in time this is across real time movement of the heart. Obviously on the left here a very different image, these are kind of showing up, highlighting a blood vessel that has been constructed from a piece of MRI scan data but it has been referenced from this kind of vascular pumping motion that you see in the image straight ahead and the a3D animation on the left can show the process of blood pumping through the aorta with the red blood cells added to describe that movement but obviously the red blood cells are not any reflection of reality as they are very large but what they are there to do is enhance the understanding of the data and allow accessibility. So I'm going to ask you again similar questions Steve how would you describe in your own word what insight the image has given of the human body and again make comparisons but bear in mind the comparisons are different in the respect that I've used this information to reference how the blood moves through rather than importing the data and although the vessel data is taken from the MR in this one but I just want to talk about using reference material and how that works.*

PA *The MR data actually although it appears to show the images as real time they are not actually real time they are a good representation of what the pumping heart is doing but the data is actually acquired over a series of heart beat while the patient holds their breath and so it is a good representation of reality but it isn't the reality is you see what I mean.*

J *Yeh, so it shows every second the heart pulses but actually it has been acquired over lie ten, twenty seconds.*

PA *That is it, so it would be acquired over say twenty odd seconds so it has been looped together to show what would be a typical representation of the heart pumping. You can see the movement of the blood through into the left ventricle and then again going out through the out flow tract is really quite nicely despite the fact it is a low resolution image, you do get a feel for greyscale movement of the blood from one area into the next as the heart contracts, sorry as the chamber the ventricle fills and then squeezes the blood out, so am I right in saying then that the characteristics of that sort of flow was then used to generate the general pattern of what is happening in this 3D visualisation?*

J *That and with the sequence of consultation with Graham and so forth and the medical team at Ninewells but it was one of the kind of influencing factors obviously the vessel itself which is shown in this was taken from that kidney that we saw earlier so the vessel is a reflection and obviously the flow and the flow is what is alive in this image.*

PA *It is nice to, I think it looks really nice of the red blood cells, the shape of them is aesthetically very pleasant I don't know about the colour, I think, how have I got in my mind that they are supposed to be straw coloured for some reason, I had it in my mind. It is good to have it translucent it gives a nice feel for flow occurring and I think the fact that you have got vessels gently moving as well, sort of rotating in 3D space give you an additional feel of movement, almost like pumping action and the representation of the actual flow patter I don't know I am aware that you will get pulses of flow like that so it is probably quite a good representation of reality and the sort of slight spiralling effecting is also known to occur, I don't really know how the distribution of the cells would occur so that again is just a modelling thing but it looks nice and I think from an understanding of how blood would flow as a patient I would be quite impressed by that.*

J *Do you think it has more integrity than the scientific data it was made from bearing in mind it was a collective process of visualisation it was reference material some MR data, do you think it looses integrity because it is not quite a bit of anything really?*

PA *I don't know I mean I think there is the added processes of interpretation will take it away from the reality of what is happening I think but whether that actually matters I don't know I don't think it really matters if you are using it for interpretation I really don't think it is important.*

J *So do you think it has enhanced then?*

PA *It has enhanced the understanding of you have got all this stuff whooshing through and it gives you a general idea that is it pulselite it is spiralling a bit and it is pretty chaotic and those three kind of baseline things are represented to at a macroscopic level although you are looking microscopically if you are looking kind of macroscopically that the way the blood is flowing as a unit the fact that you have got these cells spoiling around and stopping and starting helps you get a feel for what is going on, okay it is kind of separating microscopy and macroscapy I think it is kind of difficult.*

J *Okay so I'm going to show you some static images now Steve based on some of that moving imagery and again maybe describe how this gives you some insight of your body and the qualities of the image. I'm going to put up another image here as well. This is a, from this last couple of images, this is an image that has been produced from an MR scan again cross sectional slice and that is the aorta it is one slice of the aorta, it obviously highlight the aorta, this is the aorta it is not the same one it is not derived from that piece of data but it is again the aorta but obviously shown in a totally different way.*

PA *My thought about these are that I think the two images in order to convey a kind of understanding to a volunteer it would be useful to have both actually I think if you were to look at the 3D static interpretation it would be quite difficult to orientate yourself I mean clearly you can see cells and things floating around, I mean there is a 3D structure and you are looking at the bright as being the end of the tunnel essentially and one would assume that the flow was going, but I think my natural impression would be it would be going away from me towards the light just presuming the use of the light to give me that feeling but again you could show with the MRI data which doesn't show much at all other than if gives you an idea that the structure that you are looking at is curvy and would work down the body, it might be useful to say well what we are actually doing is we are looking inside this vessel curling down here and this is the sort of thing we are looking at with these blood cells shooting down, so I think in fact to gain the full amount I would probably like to see both together in this case. I wouldn't say inseparable but they are kind of better when they are together.*

J *Do you think they have different types of integrity for different reasons?*

PA *Well not really I would say the integrity or the representation of reality probably that is a difficult one because again it is very very much dependent on when you acquire the MRI image and in this particular case it is quite good but had you waited another ten seconds and there was no contrast within that vessel you would hardly see it and it would be absolutely meaningless so from the time that you acquired it the MR data is quite useful to me but in actual fact I couldn't answer that question.*

J *Don't worry Steve that is fine. I want to show you just another image and this is the last image and this is the last part of this, showing the visual material and this is an MR image it is taken from an MR image it is taken from the kidney image that we saw earlier but I have highlighted the narrowing of the renal artery stenosis but maybe if we can just pop you though this image lastly, what insight does this offer to the human body and then its kind of visual qualities and then just talk briefly about integrity.*

PA *This is just as a stand alone?*

J *Yeh.*

PA *Yeh I like that because I can recognise where I am very clearly it gives you a feel of a big build up that there is a pressure thing there, it visually represents a sort of pressure, a blockage, a problem I suppose the way the light is, it almost looks like a tiny volcano of the aorta and you can imagine almost as the blood goes through it that the speed of it as it goes through the*

J *There is a feeling of movement then?*

PA *Yeh there is definitely, yeh it is a nice representation of a clinically*

J *Does it make you think of anything is there any specific feel to it that you can describe?*

PA *Changes in speed, it conveys, you could almost image that the cells would be caning it down at full pelt reaching that blockage and then getting really constricted and having to slow down and creating quite a lot of force and pressure in that area, I think it the way the light works actually around the stenosis to me, it is quite nice, I got it as a sort of exploding volcano, it has got all the blood coming out of the base sort of constrained, sort of top bit, sound a load of rubbish.*

J *No that is great, okay Steve that is great and that has given me loads of detail actually it has been really useful gaining another perspective of my work, sow we will call it a day at this end of the room and we will go and get a comfy seat and get some tea and biscuits and we will move over for the last quarter of the experiment just to discuss some of the issues and stuff that we have looked at this morning. You see that there that is the computer. Okay well I've got basically three more questions to ask you but before I do that, because that end of the room is more about the work, the finished work both the MR scan data and the 3D data but what I want to do at this end of the room is just take you through some of the origins to the work or just give you almost like a snap short of the process and like you kind of just sift through so I just want to go over to the table and over to the mini max it won't take long. When I produce images it is not just a case of translating the data, I'm sure you are aware of that but it is also a process of interpretation and that comes from different sources it comes from thing like medical anatomy text books and that is obvious that I use that reference but there is also things as well, things that appear less obviously, obviously these sets of image are satellite images and a lot of the stuff that I have done has been influenced by these kind of space exploration shots and they is certainly not a scientific influence in that sense I'm not gathering that from the experiences of the patients it is kind of very much interceptive process.*

PA *You could almost translate that previous one it is a sort of kidney, almost like a lone structure*

J *Absolutely, it is almost like I used it as an inspiration to sort of tell a story of what is going on with all these structures and you can start to see here things that is obviously the art of the scan data so you start to see the influences as well and also they are a little historical influences which are quite useful which is an exhibition ??? and is has to be historical exploration of drawing and why there are certain ways of communicating that way and you adopt it and so there is all that sort of stuff but also things like getting drawing from Graham and Trudy as well for getting them to point out stuff so there is, it is almost like there is a kind of non scientific, well it is a kind of information gathering process going on and also just to show you an example which is in here, this is my kind of sketch book that I use, my digital sketch book and you kind of look a this sort of stuff, this is Vermeer's work he was a famous painter in the Netherlands about three four hundred years ago and his works were really quite influential particularly in things like mood and what not and this is Caravaggio and you see fairly abstract links and how that come through in the visualisation but to then look at this sort of stuff this is, the way I have lit*

these object has a direct kind of linkage to this kind of being more kind graduitial means of exploring issues so you can get a feel for that in that sort of stuff, but moving on to the ??? this is quite a good example, this is me developing some new work which is getting a completely interpretative piece, this isn't taken from any data this is taken from speaking to trainees, speaking to Graham using text books, now I have a good experience of anatomy I have actually sculpted this out of almost like digital clay and using this material and I suppose my thoughts are is that, does that have less integrity because I haven't started from a piece of medical data, but this sort of work, I have used the interpretation and it has been interpretation on a visual starting point of the medical data but moving into this sort of stuff which is, does that have less or more integrity because it is not born

PA *In original data*

J *But I think it maybe goes back to what you said which was 'does it really matter if it is trying to explain something to somebody' maybe it is all about context of delivery.*

PA *I think it is going to matter to a certain degree when you get to bits where you are not trying to deride anything quantitative for it, it is conveying information and I think if you were looking at deriving figures and numbers which represents a particular patients condition then you might run into some problems but from a point of view of identifying and informing people about a structure and even how the structures functions and that I don't think it matters a huge amount really.*

J *There is a good example and this is sort of, all this was built from scratch it wasn't interpreted from any scientific data but now I have experience of the vascular system I can now develop this stuff, a bit like drawing it out but not using the, and this seems a bit random this is a photography I took from the, of a mammoth in the Museum of Modern Art*

PA *Straight away thinking about those lessons*

J *If you look you can see how that has influenced the way I have selected that image, do you know what I mean, it is not and also that is definitely not some sort of, in a sense it is not got integrity or authenticity in the sense of like say the numbers side of it but it does as you are obviously changing the data to suit a completely abstract link but is some ways it maybe has a different type of*

PA *Different to, is somebody who was to turn round and say have a scan of my renal arteries and to see something that was synthesised from the previous work and experience relative to that which was generated the raw data then I would I be that worried about it?*

J *You just want the essence of what is wrong really.*

PA *I don't think I would, as long as I was getting an understanding of what it was, ah it is difficult to know again scientifically I would say I would need to see then side by side to have a really decent life like comparison I don't think it would work that image out.*

J *We will grab a seat Steve and I'll just give you a sort of like intro into where I'm coming from in this and these last sort of questions are related to that. The first question is, it is more of a general question about everything you have seen today, do these images affect the way you think about your body? In terms of the stuff you have seen obviously some of it has been very kind of aestheticised it has been quite, you described as quite pleasing and quite calming and so has it changed the way you think about your body and I don't mean in any great profound way*

PA *I think probably the movement ones would do more than the ones that were static actually, you know the blood flow ones and when you are looking at the vessels, sorry the cells pulsing through, spiralling through and then reaching an area of blockage or stenosis that seems to be quite eye opening in a way when you think about, the more you think about it the more you think my goodness that is going on inside me that kind of thing, that probably does. I think from the point of view of a more static one probably the wrong person to sort of speak to really but on the basis that you used a lot of MR images so it wouldn't be as clear cut I don't think I don't think I would have got quite so much out of, I mean the surface rendered smooth kidney is quite nice for showing you the broad anatomy, the shape that it is like a kidney bean shape. The translucent one, I mean the translucent one again on a macroscopic level is quite nice because it gives you an idea that it is compartmentalised inside but I don't quite, I wouldn't want to be sure that that represent the truth of what the compartments really are like, so again it depends on what depth you go as to what you get out of that one.*

J *I mean this is a kind of link question what would you define as visual integrity in your own practice in your own imaging, what would be your benchmark?*

PA *Good contrast so I could see the area that I was looking for, to have anatomical locators that I knew where I was bit obviously less contrast because you want to obviously want to see a particular structure quite clearly, very scientific really get a high resolution if possible, good distinct noise all the stuff that one would really like to get out of MR data but struggles with.*

J *So do you think then the kind of issue of reproducibility in a sort of having a kind of standard isn't so critical then when you are dealing with MR do you have to, you know*

PA *I think from a visualisation point of view?*

J *Well just I mean say you were submitting something to an image or a series of images based to a journal how would you be vetted by your peers on the effectiveness of your imagery would it be its ability to be reproducible what would be the benchmark to evaluating an image? Or would it be like those things you have just described, the anatomy, the contrast*

PA *Yeh I mean you just want to optimise as much as you could as far as the contrast and resolution is concerned. Reproducibility in my line of work is critical but it is not critical from a visualisation point of view, it is critical from deriving clinically useful data out of the images concerned and I think it is probably quite different but the word reproducibility and my kind of work sort of go hand in hand, absolutely no ??? I think it is vital but I don't know about from the visual side of things, I mean I have never really seen somebody who has been a volunteer say for an MRI scan who has had a contrast injection to*

obtain images of their kidneys for example and then had it done half and hour or an hour later exactly the same,

J *So it is never really*

PA *I wouldn't have a handle for what visually reproducibility you end up with.*

J *Because it is always different but it work to a group of parameters it is not going to be radically different but there will be independent differences each time.*

PA *It is quite common in MR if you are looking for anatomical variation to have, for example if you have got say like a heart and you wanted to say is this heart different shaped to normal that you would take a representation of hundreds of data sets and you basically generate a common template, so you generate a common shape which say over the course of say three hundred normal cases this is your on average, your normal heart and then any other heart that you are looking at that might be disease ridded vessel or whatever structure you are looking at you compare that with your normal template and if it was significantly different the significance then depends on your interpretation but if I was different from that common template then you could infer something from that. The other thing with interpretation is, the common template thing and it is kind of very, obviously it is going to alter between different races whether you are Caucasian or black or Asian of whatever that is going to alter things as well, what is normal for one particular race is likely or could be different for another.*

J *So there is a degree of subjectivity?*

PA *Yeh there is.*

J *The sort of last question, I'm going to do a little exercise in the final sort of 10 minutes of this experiment but I'm going to ask you one last question and then we will do the exercise, what role do you feel an artist should play in working with medical scan data, some kind of examples that people have described it as translator, mediator, illustrator*

PA *What role should an artist play?*

J *baring in mind what we have covered today and a bit about how I work and stuff I produce is it my job to just illustrate, what*

PA *I think it is*

J *Or is it more of an interaction process that happens?*

PA *It is a mediating education sort of role I think really. I mean from my point of view if I was to present a graph to a patient that says look at this significant difference between the volumes of these two kidneys for example and this group of patients who have got blockages in their arteries versus these who haven't wouldn't mean anything to them, absolutely totally nothing and it would be totally meaningless for me to do that unless they had come from the rare background whereby they know the terms etc and I think having a visualisation, a quick explanation of actually this is what the basis of the work entails and here is the finished product which is the graph it helps*

J You need an intermediate step?

PA That intermediary is an educational stage basically.

J Do you think as well there is an argument to say that there is under this kind of mediation process it is an interaction process as well to develop the imagery as kind of extended period of time with interaction with the staff in MR and extended periods of time in working with the kind of anatomical structures from the literature and then obviously hands on with the front line clinical staff, so it is not just about producing the images, it is almost like the role of the artist or whatever you want to describe me and what I do because an artist implies sort of hippie but dippy painter, it doesn't necessarily describe what I do it kind of puts such a broad term but in some ways this mediation term describes a lost of tasks that I do which are not just revolving round creating pictures, I mean it is a bit like you in your work you don't just draw a graph equally you do other aspects, what would be your thoughts?

PA One of the common things in the medical profession is that people work in vastly different careers and an interpretation of somebody with a renal artery stenosis is going differ very dramatically, somebody who works as a radiographer would like to see images acquired quickly as efficiently as possible, they would want to make sure that their delivery of the contrast agent was correct and that the patient was cared for as an overall package but they wouldn't be that worried about the size of the kidney the correlation between the kidney and the disease process, that then gets handed on to myself, the clinician has a responsibility role essentially to identify areas of abnormality from a clinical view point and that can quite often be done with interaction and feedback from ourselves from my profession and I think perhaps the role of the artist could be to sort of fill in the gaps by where one profession doesn't recognise the qualities of ??? actually in some ways and so you have got a central role which you sort of, it is hard to explain but it is a central role which is sort of potentially likely to assist with explaining to one profession why the others do it, it is a professional education within the profession potentially I think.

J So you don't think it could be described as an interface between the profession and the patient?

PA Well what I was talking about there was really the interface between one professional and another in a different group, yeh certainly that would be the obvious thing the interface between

J That is interesting so it is like two, it is almost like an internal business to business role

PA Yeh as a company to patient role essentially or as a NHS to patient, I mean the NHS to patient role is definitely the one that would spring to mind first but if you think about it even deeper I think interactions between peer.

J And in some ways it is lie, you can't separate that from the interaction between the patient and the profession because if the profession is not functioning then the patient communication side will suffer because there is not any kind of joined up thinking in terms of the way data is visualised and dealt with I mean we are probably talking quite clearly about what is

happening in radiology there is a sort of, there isn't enough joined up thinking between the, we deal in images, images seems to be the currency in radiology but there is not enough sort of sharing of imagery because it seems to be non accessible by different points and different people it is almost like an artist comes and does an audit, gets a feel for everything and then decides how they

PA *Yeh*

J *That is good Steve and the last thing I'm going to do and its a bit off the wall but it might go wrong, it seems to go both ways some people kind of react and some don't. I've got this blackboard here and what I'm going to do, you can have the red bit of chalk and I'll have a , it is really quite liberating drawing on a blackboard with all this digital stuff, and some really good stuff comes out of the blackboard, but first of all I just want to draw two diagrams, almost like two visualisation or two ways of trying to qualify the work that I do about the images that I make, and the images that you make as well in terms of the clinical stuff that is produced and one is quite linear in a sense it is almost like a band width and one quite sort of like zoned in a circular way and there are not right and wrong answers and I Kind of made these up just as a start point and feel free to contradict me or say that falls down, but I've kind of got this line on my thoughts and we have got one end, and at one end we have got the arts end and you have got, and we were talking about the Turner prizes we are talking about the images that I work with, I produce so we have got at the other end we have got the science side and we have got the MR images that I produced, and you have got I suppose, my images function at different points in this, so for instance you have got that image with the curl in it and it is fairly abstract and you wouldn't really know what you were looking at and that is quite close to this end it has a certain degree of abstraction it is kind of very aesthetic based and then you have got the aneurism one the bulge one which is quite close to its original piece of data, it has some degree of interpretation and then you have got a few others that kind of populate this line, now the way I kind of see it is that you have got sort of like a zone here you can show to patients with the best interests the fairly abstract one that I've produced and the ones that I often you know, that you have seen up there don't nearly all have an obvious kind of anatomical structure until I explain it sort of fit in this sort of zone they are kind of arts space they are kind of gallery space they are pretty and they have a value but it is maybe not a value of showing patients, and you have kind of got these two zones here and then you have got the MR images but what you have said they are not kind of an absolute truth, this is an absolute scientific replication of reality and they are actually kind of populating this line quite close to here, they are sort of sitting in this zone here, but the other way of seeing this, so that is quite a linear band width of work and the other way of seeing it is you have got zones like this and you have got heart, I mean science by the scientific images that the scanner makes in this case and then you have the arts side and I suppose you could say like that image, there is kind of two good images, that is taken from a reconstruction at Ninewells that is from the same piece of data and obviously that image is getting quite close to a kind of abstracted piece of information it is quite close to the arts one and this one is quite close to the science one and you have got all the other images that populate this zone and then you have got cross over images that live in this bit in between they have got a bit of arts but they have got a bit of a scion and they really become quite useful to patients.*

PA *Could I, my own, well my first comment of this is that they are showing exactly the same thing, you have effectively got a vertical scale in each of these two which you haven't got in this but essentially that line goes through it there and this is your mid zone which is your patient zone and this your arts zone which is there and that is your science zone but to me that is exactly the same, except for some reason you have got a vertical scale which the lines represents, that one and you haven't got a vertical scale on that so out of those two I would definitely, I would just pick that for me.*

J *I suppose do you think there is a Z axis them on this line that we haven't*

PA *Is there an X, Y, Z, I don't know, what does that mean if you are saying is it at the top or bottom of science, I mean having the simple 1D X axis thing is very understandable and that actually falls exactly into place with a lot of the comments I came out with, probably through a bit of chance, but my interpretation of your ??? is definitely there but then the patient data, your interpretation of the renal stenosis for example, there is in understanding, lie a visual analogue state which they use for pain thresholds and stuff, it is open ended a section it could go right down here to the other side of the board I suppose.*

J *Do you think there is another one though, this is like a 3rd one and it is like this and you have got a kind of graph that goes like that and then you have got a peak here of the distribution and in terms of like, you have got kind of abstraction here and you have got sort of a functional here*

PA *I think my label on the axis of the vertical would be patient understanding actually, so then what you are then doing is you are translating exactly into this so top abstract is your arts and the bottom abstract is your science then and your understanding window is here and you have just got your X again so that would be my understanding of that at the moment.*

J *I mean this Is almost like based on ticking the boxes these are actually distilled from comments rather than distilled from like you know, it is almost like I'm building sort of graphical representations of things that are not scored from, I mean tick three boxes and I would say they are actually scored from the interpretation of the audio data of discussion and*

PA *Is there an X, Y, Z and what is it, it is quite*

J *Yeh and what would be the Z in that, and some people have said is the Z emotion because obviously understanding is like a did you get that, the blood was moving from A to B, how do you define the aesthetic content because when you say something is aesthetically pleasing what is making you feel like that, it is an emotional response you are getting an emotional response from someone so the images can be described as emotive so is there like another parameter that says you have got understanding and you have got communication and like my job which is to visualise as this is effectively the viz isn't it we are describing the viz at one end of the abstract that is the units almost and then the other ones are the clarity isn't it.*

PA *I think this is where, would I have done my jumping in and condensing those graphs it is just what I would do scientifically because you get for example a bigger ray of image data and in my mind would then work to say what can we get out of this data, come and condense it into a certain set of numbers that*

mean something and to go to the 1D is the more simple way to me so I have real difficulty in visualising this as a 3D and working out what the other axis would be because you have got your abstract

J *I mean could you describe it as like, it is almost like we are trying to simplify if but in actual fact it is such a complex thing and we can't it is almost like we can't because we are saying that is 2D but in actual fact it is like s sphere, it is like as*

PA *So you have got a multiple array of*

J *and you have got overlapping screens, you have got all these like trajectories of atoms and trajectory of like electrons they are actually like, and you have got multiple kind of cross overs you have got like high emotion low clarity, it does, this is a bit like you have got a lot of complex parameters, you are dealing with discussion and dialogue you are not putting things into the scale so to manage that large piece of data like that is quite difficult to put into these sort of schematics and*

PA *I just think interpreting something like that becomes out of control that is the problem it is like you have a series of variables that all interact with each other*

J *What is really interesting Steve it is almost like the key words are like how do you translate that, it is like complexity theory isn't it, when you are dealing with human emotions and disease and humans interpretations because someone might say like that girl was really ugly and others I thought she was really pretty*

PA *How to interpret*

J *So when you said you liked that image and there will probably say they like that but some of the artists might say that is really naïve I think that is a real, so you are dealing with quite a subjective issue, I'm just thinking how physicist deal with this, how do they deal with complexity*

PA *I mean it is basically looking for the lowest common denominator all the time,*

J *Is it, do you want to write that there, looking for the most common denominator, I'm just trying to make sure I don't forget this.*

PA *I feel like a teacher*

J *I love that writing on the blackboard is it like being back at school again*

PA *It is horrible isn't. So your first description of this was kind of how would, I would identify with that immediately and I thought that was a really nice way of describing this but this model essentially covers everything but it would be to my mind interpretable this model is grossly simplified but interpretable so I would say that is going to take in the lowest common feature because zoning on the same things, I mean this axis could be labelled to anything it is not necessarily that is more abstractness this is more arty that is more arty it could be patients feel more emotion and less emotion so a line here could represent any orbit of where you are trying, well as a scientist I would pull out which one was going to give the clearest separation I mean that is where you*

end put could be if you are doing an experiment I mean which ones give you the most clear separation on this sliding scale or something and what is most useful and what you would probably end up with, that is just a thought.

J *That is totally right, it is trying to tease out the issues that you are dealing with in a graphical sense, it is very difficult, when you start writing and talking about it particularly in an academic level it is almost like you say you are constantly trying to find the lowest common denominator but being a visual person I'm really keen to try and sort of like could it be described and in some of diagram but not in a diagram in the sense of I've got like 100 patients and what my n value is this for distribution curve is this and that is not the type of PhD I'm doing so it almost like I'm trying to pick a mechanism based on maybe some established processes for plotting out data but the data I'm starting with is not numbers it isn't values in that sense it is feeling it is peoples options that I'm plotting into this*

PA *You can't really separate that our I suppose you cloud, you scale of width will sort of represent variations human variation for whatever thing you pick*

J *Photograph don't get them mixed up you will have like 20, that is great Steve we will probably call it a day there we have got loads, that is one and a half hours*

2.3. Physicist B

Interview with Physicist B
Date: 17/10/06
Time: 14:00
Duration: 1:09:22

J *I've got a series of questions I'm going to ask you about the imagery I'm going to put up on screen and the images are slit into two screens obviously two projections, one projection is MR data the CT data that the images were produced from and the other one is obviously the 3D translations that I have produced and what I'm going to do is put up two images at the same time and I'm just going to ask you questions and will obviously encourage you make comparisons between the two and I'm obviously going to give you a description of what they are, the MR images and the CT images I'm sure you will know straight away what they are but just for consistency I'll take you through what they are as obviously a lot of the other people won't know what they are that are taking part so as you can seen there it is split up into four sections so the artery, the kidney, aneurisms and blood flow and I'm just going to take you through each section so I'll take you into the artery stuff. Now just before I ask any questions I'm going to let you reflect on the imagery for a few seconds before I ask you these questions. So I'll explain what you are looking at Steve but this is the firs image in front of you here is a MRI taken from a scan at Ninewells Hospital and it is a sequence of cross sectional slices of the head and neck and the area highlighted in white is the arteries that supply blood and oxygen to the brain, the image on the left is an animation or interpretation of that same data using the geometry extracted from that two dimensional scan to construct this and it has been reconstructed with texture and lighting and alternative camera view to create 3D stuff and the sequence has been knitted together in a short looping sequence. So the first question is please describe in your own words these images and what insight they offer into the human body and I would encourage you if you would like to make comparisons please do but you can start or move onto another image if you want.*

PB *That is a quite difficult question to answer in the cross sectional images in the way the movie is playing through your eyes are kind of drawn to individual parts and you sort of track the vessels as this one kind of scrolls through whereas the 3D imagery you have got everything these you are actually perhaps seeing the whole of the vessel structure whereas with this one although you can see all the vessels in a single slice as it tracks through you are probably with this image more focused on specific areas individually because you just spot an area of white and then track it through as you read through the slices and I think that one you are getting more a better idea of the whole of the vascular structure*

J *Do you think, how would you describe the visual qualities of these images in the terms of the way they look?*

PB *They just, that sort of greyscale light and dark and from an MR physics point of view you can spot the artefacts from the blood flow and things like that*

going up the neck and there is a little bit of return of Venus flow in there as well, never mind that, em, the 3D representations in terms of quality they are very good and sometimes there are bit that kind of look a bit too angular and I don't know if that is due to the fact that you MR data that you have taken it from obviously had a finer resolution you sort of get little bits where everything is going to be a bit pixelated and obviously you can interpretate to a certain extent but the colour and lighting is very good and you see different elements of it.

J Is there a certain thing that makes you feel or certain things or qualities that you cause a certain response in you or is that

PB I wouldn't say so I've seen enough of these images they become a bit sterilised to the whole type of geometry of images and perhaps you are thinking more about the anatomy rather than the actual aesthetics of the image themselves.

J Sure, do you feel the interpretation of the image has less integrity to its abstract nature or more?

PB Em, don't think so, it shows where the vessels go which in a, if that is the information that you want to convey to people then that is kind of, it works very well and if anything it is kind of the tomographic imaging that is kind of more abstract because people are aren't used to looking at tomographic images apart from sort of like radiologists and radiographers and physicists and I think your mind set does get into the whole concept of looking at a slice so you are only looking at finite elements of effectively a three dimensional object whereas what you have done is perhaps almost taken it back a step so actually kind of pulls it back to be more what you would expect it to be more of a visual image rather than a tomographic image

J Do you think that the integrity of this image is stronger because it is closer to the scan which is obviously a scientific image?

PB Not necessarily, I mean every image is an interpretation of the object you are scanning so it is a case of MR images just looking at the proton density in different areas of the body and that is all controlled by your contrast your resolution and so that is just a representation of the person's body and I suppose taking it on again to create your visual image from that and all you are doing is just representing the same information in a different way I don't think it takes anything away and the same with most techniques is often that doing processing on the image actually enhanced it in the way you have got your 3D dataset there and you can see it in the 3D so you are not thinking how can I, where those vessels go you can actually see where the vessels go because you have effectively represented the image in a three dimensional representation which is what somebody would expect to see if you could literally strip out the rest of the person and just leave the vessels in the same place without having moved them.

J Okay and a sort of, there is four questions, as a clinician/scientist Steve do you think that the art has enhanced or diluted the original data?

PB I think for an image like this you have probably enhanced the data because really because this image is just the idea is to look at the vessels then that is the only information that you are really interested in are the vessels being

light and everything else is a bit sort of redundant so by just extracting out the vessels in your 3-D image I don't think you have lost any of the data, I mean obviously with the three dimensional MR dataset you can still see the shape of the person's head, you can still see the muscles you can see the neck and some of the vertebrate so you can get an idea of where the vessels sit with relation to other anatomy which obviously you don't get from your 3-D model, but I mean for an image like this really that is not what you are aiming for you want to look at the vasculature and just the vascular alone obviously if you, if it was intended that you wanted to look at the vasculature in relation to the rest of the anatomy then your model may not be as useful because you don't have the anatomy there.

J So it is a kind of purpose?

PB Yeh

J Okay, I'm going to just show you some static images again it is of the same dataset and I'll jump back to the menu and just slow things down a little bit here. I'm just going to scroll through these there is 3 or 4 images in this set I'm just going to scroll through them and let you look for a minute and then I'll start with the one that I want us to talk about but they are all similar images but they various degrees of interpretation from that original vascular dataset. I just want to start with this one, obviously I've put the static one up just as a reference in your own words how would you describe, in your own words what insight does this imager offer into the human body and obviously related to that Steve which is maybe easier to describe how would you describe the visual qualities of this image in this case?

PB Obviously you have got some means of changing the focus with depth you are actually compelling the focus on a certain area and it does almost make you feel you are looking at a more three dimensional image rather than just a two dimensional image of a three dimensional object.

J Does it make you feel anything in terms of aesthetics?

PB It feels a bit strange because, but then you get used to looking at images that have things in focus and out of focus that perhaps with me being kind of scientist and having seen rendered images before you don't expect it to look like that and perhaps kind of a bit strange and surprising but you find that you are not really looking at anything else apart from the two vessels coming together and the way they sort of curl round and then stop and go out of focus.

J Do you feel the interpretative image has less integrity due to its abstract nature?

PB I think

J Obviously from its original starting point.

PB I think with this one I would probably have to say yes because you are loosing a data out of the blurred stuff you have done a thing you are just focusing on one tiny area whereas having it all kind of in focus you can see the whole thing and see how that relates to other areas in the image, I think there is perhaps an interpretation image it is perhaps not as good as say just having

the standard ones in focus. I think it might be more realistic in terms of a real representation of the object itself and how a person would perceive that object.

J *Do you think it gives any sort of insight into the body over and above just purely functional and the location of the anatomy? I mean don't worry if you can't answer it, it is not*

PB *I would probably have to say no in the way the images are they are kind of more representations of positions and contrasts, it obviously give you a representation perhaps the colour of the vessels the angle and the way the light interact with them but then that does become very abstract and I think kind of those images would engage you more than the base MR images but I'm not certain whether if gives you more insight into what is going on over and above positions of the anatomy.*

J *Sure, and as a kind of clinician/scientist do you think it has enhanced or diluted the original data?*

PB *Just looking at that static image I would probably say, the bits that are in focus it is probably enhanced because again you can see the path of the vessels you can see the actual lumine of the vessels but as soon as you go out of focus you are kind of loosing it whereas you do maintain that in the original base images.*

J *Okay and you think in terms of the aesthetics you think it, does it do anything for you?*

PB *I think it is a very nice image whether it does anything for me I don't know.*

J *Okay we will jump onto the kidney which is the next area. So we will start with image dataset here and you are probably aware Steve that image one again is taken from an MRI scan and these are again cross sectional slices taken from front to back, this scan was performed on a diagnosis of a vascular condition called renal artery stenosis and it is a serious condition that occurs when vessels feeding the kidney become blocked and narrowed due to a built up of arterial plaque and this may result in a surgical intervention by a clinician, image two on the left here is the same piece of data reconstructed with texturing and digital lighting as well as transparency to create a 3D visualisation. Please describe in your words these images and what insight they offer into the human body and we will start with the*

PB *Certainly in these images you can see the kidney very well which, I think what kind of insights really whether we are looking for anatomical insights of biological insights and it kind of tells you that the kidneys do get well profused in terms of blood supply to them so take up the contrast, again you can kind of see the kidney does have some sort of internal structure it is kind of like the cortex in the medulla can't remember which one is which, you can see the 3D rendered image you have kind of managed to actually capture that in just a single scan where you have got the transparent outline which is the main body of the kidney and then you can actually see the smaller elements inside, the blood vessel that is feeding them.*

J *How would you describe the visual qualities of these images Steve in terms of what they are made up of?*

PB *Again the MR image, just because I know how they do these it is a subtraction image which is why you can't really see a lot of the background signal apart from in regions that have obviously been enhanced so you can see some of the bowel there but I think is, is very kind of an image of black and white and it kind of looks a bit grainy because the patient has obviously move a bit and when you go subtraction you do get sort of like little lines round the borders but again there you are looking at blacks and white rally whereas with your image you have kind of got everything there you have the different range of colouring you have to the lighting and you can actually see the kidney structure a lot better because obviously we see the focal area of black inside of the right of the kidney you don't really get an appreciation of what that actually looks like in three dimensions and that is kind of where your image kind of excels as you can see the three dimensional structure of the kidney rather than just the sort of base two dimensional structure.*

J *Do you think it offers in terms of its visual quality is just more than just giving you an insight into the structure or anything does it give you any other insight or are you just purely accessing it on its ability to convey the anatomy?*

PB *Obviously kind of terms of, you have got colour in there and you have taken those colours in terms of, from what you would expect a kidney to look like but what you can do with your data but obviously somebody can't do with say just a kidney from a, like anatomy is that you can actually fade out the outline and look inside it, I think you have kind of captured a lot more from the, over and above the anatomy with the colours and the shapes and you can see where the vessels go, actually go into the kidney itself apart from just going up and around.*

J *Do you feel the interpreted image has less integrity or more than its original/*

PB *I would say it has got more integrity here, it is easier to see what the kidney looks like on that image than it is on those images but then it is difficult to say as I'm very used to looking at those images.*

J *Sure the scientific ones?*

PB *Yes*

J *Okay and as a clinician/scientists do you think the artist has enhanced or diluted the original 2D data and if so in what way?*

PB *Again in this case I think you enhanced the data as you can see the form structure and function and by adding in the colours and the lighting effectively it is almost like removing the kidney from a patient and giving someone a really good idea of what the kidney would look like if it was outside the patient and not just what the kidney would look like but what the kidney would look like if you took away this element of the kidney I think just look at a certain element of the kidney as well, I think it does give a lot more insight than just the base images.*

J *I'm going to show you another image Steve here and this is the same piece of data but it has been reinterpreted and it has been relit and again it all comes from this one starting point but it shows a very different type of image and I suppose again based on these questions that I keep asking is kind of first of*

all what kind of insight does it give into the human body and then describe its qualities and we will talk a little bit about integrity, so what insight is offers you and what kind of visual quality of the image?

PB *Is that actually a 3D model or is a picture of a*

J *It is a 3D model of that and it has been relit using a certain technique to make it look a certain way.*

PB *I think it is not as engaging as the other ones as you don't have the degree of transparency, it kind of give you a better idea of the form and structure of the kidney whereas that is kind of, it just looks like a lump with a thing sticking out of it. The lighting, all you are seeing is the surface and as an image it looks okay but I think you would be hard pressed to say it was a kidney if you are just presented with it whereas the other one the previous image you would say yes that is a kidney.*

J *And did you feel that the anatomical image has less integrity in its abstract nature?*

PB *I think this one does yeh*

J *And as an image that is presented do you think that the artist has enhanced or diluted the 2D data?*

PB *Just from that single image I would probably say yes but then if you had a 3D the 3D data in that form you look at it from different angles then.*

J *I mean maybe try to look beyond functionality does it explain what it is from its aesthetic point of view does it give any other insight, not a trick question honestly?*

PB *Yeh I know it is just a very difficult question to answer*

J *Don't worry we will move onto the next lot of images, there is no right and wrong answers, how do you feel about that image, what do you feel in terms of just looking at it purely as an image and not knowing where it has come from?*

PB *Purely as an image it is kind of, it looks kind of interesting and the shape and the form but I would probably be thinking is that a bit of tree of a bit of bone or something like that I wouldn't any, it is a nice image but it is not if you compared it with the previous image I suppose perhaps I am coming too much from looking at the function and the form rather than the aesthetics, it is a nice image to look at.*

J *Okay we will move onto the aneurism data and the first question is please describe, sorry I wont ask you the question now I will just tell you what they are but you probably know what they are but this is a CT scan of an aorta the main artery that feed blood from the heart these diagnostic images are used to detect the condition called abdominal aortic aneurisms a life threatening condition and it exists at the bottom part of the aorta these images on the left are a 3D reconstruction with some basic interpretive colouring and some basic camera views. Please describe in your own words these images and what insight they offer you of the human body?*

PB *Again I think the CT images don't show everything in relation to the anatomy you see the vessels are a lot less well just because of the nature of the data the vessels are kind of grey so unless you know what you are looking for it would be quite difficult to track through and there you can see the white splodges outside of the vessel as there is obviously some sort of calcification going on in the vessel wall but you would kind of have to have a trained eye to know what you are looking at and there is your images are kind of quite obvious of what you are actually what your eye is aiming for.*

J *And how would you describe the visual qualities, I suppose you have sort of described that one in terms of the way that one looks, what it is telling you what it is saying to you.*

PB *I think there is again by having the skeleton in there you do get a kind of feeling that it is an object that is within someone's body rather than perhaps just something that is kind of floating and free so probably just not in the case of knowing where it is positioned relative to persons whatever in position and anatomy etc but perhaps looking at that person would get a very good idea that this something in someone's body rather than just something that is kind of floating free, by grounding it in something that is a bit more sort of common, people, yeh I know what a skeleton looks like and so they put the aorta in there and ah that will help people in terms of understanding and sort of where things are and what thing do and that kind of thing*

J *Do you feel that the interpretive image has less integrity due to its abstract nature, I mean it is abstract but it is not abstract it has obvious kind of anatomical, so you are going to get in context, so do you think it has got more integrity or less?*

PB *It is difficult to say because you have put added colour in there where I probably wouldn't say that the colours were 100% accurate but it gives a good representation of what a blood vessel would look like whereas the CT images are all in shades of grey or there is no representation there about sort of colour and it is just kind of all on anatomy and form but I think yours does kind of give it a little bit extra.*

J *There are a few other images I'll just flash up which are prospective but as a clinician/scientist do you think the artist has diluted the 2D data or enhanced it or neither?*

PB *Probably say you have enhanced it, because, difficult because I'm just going to spew out the same things that is shows anyone looking at that a doctor could say that is your aneurism and you would oh my whereas you showed a patient that image and go that is your aneurism and they go 'where'.*

J *I'm just going to flash up some other images Steve and just throw any comment on the visual qualities anything you want to add that you haven't said already in terms of this is a different viewpoint of the same image obviously it is a the camera has moved slightly to give you a three dimensional*

PB *You can see there is kind of little blips of texture and I'm wondering if perhaps they are just artefacts from, you have got that calcification on the aorta*

J Quite possibly

PB And from an aesthetic point of view you could actually just smoothed it out and make it look more aesthetically pleasing as these little bumps do kind of take away it looks kind of more, perhaps more of a rendered image and less of an image that you kind of developed from the data.

J Okay, we will move onto the last set of images Steve, this one is called blood flow and I'm going to show you some animation

PB I know it well

J I will explain to you what there ones are this is an MRI image from a scan taken at Perth Royal Infirmary, NHS Tayside and this image is a cross section of slices taken from a pulsing heart and these differ from the other images because these are taken over time instead of one moment in time which the other slices were from the other images and it also reflects the real time movement of the heart, this image on the left is a blood vessel that has been constructed from MRI scan data, not this particular data although this pulsing heart helped inform this blood flow and I used this blood flow as you can see in this pulsing heart is referenced to help construct the movement of these red blood cells to the body, the animation shows the processing of the aorta and the red blood cells are added to describe the flow movement although they do not reflect the reality or the size of these microscopic blood cells, I suppose the first one to start with is please describe in your own words these two images and what insight they give you to the human body?

PB Well I wouldn't say, well certainly the cardiac images do provide probably actually a lot more insight in terms of what is going on as you do get the impression of this is actually a person who is alive with the images moving whereas with all the other images that you have seen they have all been quite static it is just kind of, you are just looking as slices through a fixed image at a certain time point whereas here you have kind of got a feeling that this is sort of real there is something going on there and you can see the blood kind of squirting in and out of the heart and okay I mean that is mainly down to a, what is called a flow artefact but it does actually give you that insight into how the heart works and kind of give an impression of the blood getting squirted out through the aorta.

J In terms of the visual quality of these images and obviously what insight it offers?

PB I think certainly the 3D blood flow just offers a lot of insight because you can actually see what is happening on a individual level and like you said that the kind of blood cell the blood cells may not be to scale but you kind of see and it gives you that impression of you know what is going on you know where they are going and how they are moving and I think that has got the kind of insight you probably never see with MR you would never get down to the kind of resolution where you would see sort of blood cells and in capturing that you are adding to the understanding of how the body works.

J And do you think they have got less integrity or more integrity than some of the information what was constructed from the 3D as this has been constructed with a kind of blended approach you have got a bit of reference material and sort of an aorta taken from some scan data and then particles

that sort of mix mash of different things so do you think that affects this or does it enhance it or does it not really matter I suppose it is about context is it?

PB *You obviously used appropriate modelling to simulate the blood flow so I think in that situation you are adding a lot to the integrity of the image, you are showing the blood flow on a microscopic level and from aesthetics point of view it is easier to watch blood cells flying along the vessels than it is kind of watch an image where you watch things going less grey and more grey as it just happens to be flowing blood, I think yeh it does have more aesthetic appeal just because you can see what is flowing along the blood and you can know that blood vessels have blood cells in them so actually watching the cells float along, getting pushes along and not just kind of moving along uniformly, you have captured that and I think it is like most things you create a full model which perhaps just had the cells moving at a constant rate like creating an accurate model as you have done here you really capture that and in that sense that the cells are being pushed along in time with the heart beat I think that does enhance it a lot.*

J *And do you think that, so it is enhanced rather than diluted the 3D data then?*

PB *I think is has because you have managed to add, you have effectively added a lot to the dataset and in modelling the blood flow you have kind of added to the data and therefore you have improved it and given it a lot more integrity because you used an accurate model of how blood would flow.*

J *Okay Steve just one sorry two more images and then we are done this part of the, I want to start with this image and again these are on the one side we have got a kind of three dimensional image that has been created from and aorta and we have a scan of an aorta just a slice at the point that captures the flow of blood through the aorta and I just want to ask you same the same questions, what insights does each one of these images give you and what would you describe as the visual qualities?*

PB *I would say for the static MR image in terms of insights it just kind of tells you where the vessels are it is kind of more anatomy whereas in that image you have seen the individual blood cells and in looking at that I was kind of thinking you almost imagine that being like watching beans floating through space it has almost reached a high degree of abstraction even though it is kind of modelling a real process.*

J *Okay and do you think it is, you don't feel it is an enhancement of the 2D data although it wasn't derived from this data but it is maybe unfair to ask if it is an enhancement or a dilution as it is a separate thing*

PB *I think we have kind of reached that stage where because you have combined it with a kind of cell data and how the cells move etc you have kind of really it is more about the cells and looking at the blood cells which is not really what the MR image is about the MR image is just almost like a small fraction of that whole picture so it has kind of become a little bit redundant to actually make a comparison between the two.*

J *Okay and this last one Steve in terms of visual quality of this image what would you say in terms of what insight this offers in the human body?*

PB *Again it is difficult to say even though I know what I'm looking at, it would still be almost saying I'm sure that is not from a science fiction film it does have that element of the fantastic to it which is perhaps what you are actually conveying is that the human body is a fantastic thing and it is almost so abstract that you need to have things like this to represent it and perhaps having the base MR images and base CT images are kind of almost kind of making a mockery how fantastic the human body is representing it like this does kind of say this is an absolutely amazing thing sort of watching blood cells fly down*

J *So again it boils down to it is not necessarily about enhancement and diluting it is actually just changing the whole thing altogether in a different domain*

PB *I mean the MR and the CT images can almost be see as just your starting point rather than a sort of, you shouldn't really be comparing the two of these I mean aesthetically if you had a non scientific person coming in here and look at that and go what is it and then look at that and go oh wow even if they didn't know what that was they might find it more engaging and aesthetically pleasing than that one.*

J *Okay good Steve that is great, so what we are going to do is we are going to have seat over there and I'm just going to ask you a couple more questions and that is us done. So Steve in this last sort of 10 minutes or so what I want to do is I just want to ask you a couple of questions but before we do that the room has been split into two and these are the kind of artefacts that we produced but in the process of producing these artefacts isn't just a kind of translation process it is more about what you kind of say it is building all these, bringing all these bits in together to then produce a sort of whole so I just wanted to kind of give you some insight of my process as it will help you in these next questions, it is not going to any great depth to what I do but it will give you a starting point but the images are not pure translations of the data and there is a lot of inputs for instance there is the obvious things like the kind of anatomy and reference material that I used to try and develop the stuff but I also kind of tapped into the more kind of abstract inputs and a lot of the work that I put into these sorts of genealogical and astrological imagery it has really been quite an inspiring for me and you can see there is a lot of synergy between the kind of structure of the earth from space and internal body spaces and you can just seen by this influenced my work and stuff like that*

PB *Certainly there is a lot of the astronomical images of neck bones and think that is fantastic but if you look at the basic you realise they are absolutely rubbish because they are ultravioletly just pulled them in and tweaked the colours to make them look.*

J *It is just like the cellular data it is all like pea soup but in reality but you stain it in such a way and the other things as well is it is kind of historical influence as well but this kind of data influences like Graham and working with yourself producing drawings and obviously you telling me where things are and there were lots of emails flying through and it was a kind of filing process to get the work and this is for example one of these images but I'm not going to do stuff that I'm being influenced by kind of more traditional media as well like Vermeer and Caravaggio there is not just one translation process it is kind of mixed with different influences that kind of produce the work and this and in different levels of visualisation and some of its origin in the data and it has got*

a lot of data from the scans produced very basic render but for instance this vascular is purely interpretative I've sculpted this from scratch and not used any scientific data but does that mean is has got less integrity because it is not born from the scientific data does it change I means some of the issues I'm wrestling with another thing is this is an example here which will come up in a second which again it is very superficial but this image that I took in the Natural History Museum in New York and it seems completely unrelated or unlinked to visualisation of human body and the work that I'm doing but it had a baring on how I produced some of the images as it is how this kind of harmony structure and symmetry that I was seeking to find in these vessels and I want to highlight them so you can see that there is a kind of complex process that goes into the image that is not just about translation and so in doing so it kind of complicate how you evaluate, you are not just evaluating artefact you are actually evaluating the process in making them, do you know what I mean

PB Yeh

J So that is where I want to start these questions the first question is do you think the images, do these images affect the way in think about your own body?

PB Probably have to say no but I think that is because I've been around MR for such a long time that you think you kind of get a bit sort of like sterilised to it that you can look at images of your brain and not think that is an image of my brain wait a minute that is an image of my brain, no you just think image of the brain you kind of you are just linking it to the fact that yeh the scanner has just taken a slice through there it is just extracted out radio frequency information and created this image, no you are not thinking about whether it is an object that is just the image and you are kind of not worried about exactly what it is representing.

J Sure, okay and the second question is what would you define as visual integrity in your own practice. In your own image making what would be the parameters for creating an authentic or an image with integrity?

PB Em, I think it would have to have a very good link to the objects so I mean the implication there is you have to have some sort of spatial localisation and this is just me spouting my imaging physics stuff

J And reproducibility is like a no brainer as well you need to reproduce abilities that is probably another, it can't be a flash in the pan image it would have to stand up to peer review, would you say that is part of the

PB Yeh I mean you have got to have some sort of spatial localisation of the whole representation of you have got this object you have got the image there must be something sort of tangible linking the two because if you haven't got that then the two kind of float independently and even the images, like you said you sculpted from scratch there I mean the object you are meant to be working from becomes intangible because you are not working from an actual object you are just kind of imaging you create an image of a heart but obviously you are using experience and sort of other data to actually create that image so perhaps you are not kind of linking that object to image but you are linking a huge range of sort of things to produce your image but there still has to be that link there or else the final object just doesn't relate to what you

intend it to relate whether that is enough or important enough or not in some respects but I think for me it is you know you have got to have that relationship that your object is there, your image is here and there has got to be some relationship between the two, that kind of, if you have got resolution and be able to see the detail and contrast again and be able to see the detail.

J *Okay one last question and then I'm going to do just a quick exercise more of a fun thing, but what role do you feel artists should play in working with medical scan data I mean some of the words have been used to describe what it is I do is a sort of translator, mediator, illustrator what would you feel the role of an artist was working in this sort of field, baring in mind what we have discussed today and what you have seen of the process I suppose?*

PB *I certainly believe that the way a lot of the imaging ?? are nowadays they are quite abstract even a plain x-ray can have a certain degree of abstraction unless you know what you are looking for and so anything that sort of remove the abstractional or at least bring it back into more of a perhaps into a different arena of abstraction, you know like your blood vessels with the cells flowing through you kind of, you have taken data and okay what you have produced will look pretty abstract it won't look like a real vessel in a real persons body if you were to cut them open and open it up but I think kind of it represents more what people actually want to see and understand and I think that is quite important, is that to look at a MR image you might be thinking okay what am I looking at somebody might point things out but then it is kind of what does that do what is that, whereas actually seeing an image that has a different degree of abstraction but has been created and targeted towards peoples understanding then that has got to be useful.*

J *Okay good Steve, the last thing we are going to do Steve is a bit more fun and it is this, I'll explain why, I have been trying to sort of visualise exactly where my work sits in terms of it is almost like trying to build a diagram or a graphic representation to what it is I do and how I place all these images as they have varying degrees of interpretation and varying degrees of inputs some are very kind of obvious translations and others are not and some take very short periods to produce and others take very long periods to produce and obviously I'm interested in telling different stories and I have kind of described them in two ways but these are definitely not definitive and they are full of they are just a starting point for this discussion but at the one end we have got kind of the MR pure images and then we have got kind of scientific reproducibility and the we have got at the other end we have got the kind of arts and this is all kind of function of the domain of the clinical/medical visualisation do you know what I mean, how can I say art in a kind of focus term in terms of what I'm producing and so we have kind of got, where does some of my work fit well you could argue that image of the veritable arteries are cerebral kind of vessels they are fairly abstract and they fit quite close to this kind of abstracting or abstracted end of things and then you have got the kind of aneurism image which is fairly close and then you have go the MR and they are not probably right at the end of this cause there are the modalities in a way and they are not true representations so MR sort of sits on this end but they are not accessible to patients until they get moved and translated so there is a few different ones and the kidney probably sits here and these are the ones I have been showing patients but obviously some of the abstracted ones I'm not producing for the patients because they wouldn't really get much out of them, they wouldn't get much of them in terms of the function but they might get something out of the terms of emotion so they*

have emotional content and they have they can easily sit in a gallery space and be admired for their beauty and whatever you want in describing the way they are like so you have kind of got this kind of band width with the kind of extremes that I then abstraction then you have got kind of pure data and the other way I thought of it was, this is a similar diagram we have two circles and you have one and they both have a centre points and one is the sort of art space fairly abstracted in the middle you have got images that populate round about here and then the other end you have got a ?? that you know what you mean with the clinical stuff and then you have got images that kind of populate and then we have got images that sit in this sort of domain here and these are the ones that ??? know what I mean, so they have sort of two, there is kind of two models but I think my worry is that these are too simplistic they don't really have a, they are quite linear in the sense that they don't deal with complexity they are kind of like rationalised quite a complicated issue and it is almost like when you say these are kind of two circles they don't really include emotion they don't include multiple interpretations or anything, I mean one mans abstract can be another mans science you know what I mean and so you are almost like, so you have almost got you could describe you have got spheres of complexity you have got zones of overlap it is almost like, you have got things that are constantly moving because interpretation is quite subjective it changes depending on mood and general, so you have got this kind of circular but I don't know, how would you model something like that Steve how would you model

PB *It is very difficult and I suppose the way you could think about it is to, you could actually translate them as having like a multi dimension in space where you can actually ??? sort of adding a sort of three dimensional space but instead of having X,Y and Z you have perhaps got, you gave me a nice bit of chalk, you have got science , art and I don't know motion down there and effectively images kind of populate themselves in this three dimensional space in terms of if it is purely an artistic image it wouldn't lie up here but depending on if it has no scientific value it would kind of be along this line, if it evokes emotion it would probably go out this way and end up in the arts emotion plane as it were and obviously depending on how many of these things you had would depend on how many of these you needed and if you were thinking about it you have to, as this model kind of assumes that arts, animation are relatively independent which I suppose you could probably assume that art doesn't have to be emotional, art can be just completely you know, what is the word for it, there is a word for it, the opposite of emotional so I think you could probably say that they are kind of relatively independent to each other you don't just have to stick with three you have these endomentional spaces where each image can comprises a point and so it will depend on where the image lies you might find that the best images for patients kind of lies on the cluster that has a certain range of scienceness, artisticness a certain range of emotion and a certain range of whatever else you just have in there*

J *I suppose the only problem I have with like I'm not dealing in data in terms of numbers I'm dealing with like peoples reflections of what I'm looking at and can you spell out those reflections how they feel I suppose you could score in certain ways I suppose*

PB *Well you can take things like a visual analogue scale where you just have a line say, do you say this is artistic or not artistic and say put that there and is that your semi qualitative measure of the*

2.4. Fine Artist A

Interview with Fine Artist A
Date: 17/10/06
Time: 15:15
Duration: 1:25:18

J *The way that I've structured this in terms of the way we are going to navigate through this Edwin is on this side, this is some of the 3D visualisation work that I have produced and they vary in degrees of interpretation some are kind of quite literal, some have some degree of abstraction to them and on this side of the, this projector this is the data that it has been derived from this is the raw scientific scans that have been produced to help me build some of these pieces*

FA *Okay, so basically you have the human body and you have the scans, your interpretation and then is your representation ones*

J *Exactly I mean most of the, well all of the work on this stuff is pure scientific data it has not been changed or doctored by me in any sense*

FA *This is what is given to you?*

J *Exactly, so we are going to start, we are split in to four sections, artery, kidney and aorta so we will start off with the artery and I'm just going to put the first set of images, this is the image and I will explain what the sequence is as I think it is quite important that I give you some context to help you navigate through it and I'll explain what they are and I'll give you a few seconds, obviously to reflect on that and the absorption time but on the screen straight ahead this is an MRI, a magnetic resonance image taken at Ninewells Hospital in Dundee and this sequences is cross sectional slices of the head and neck so it is not animated in the sense that this is not over any time period this is basically almost like a bread slicer has gone through your body and cut these images and the images are scrolling backwards and forwards*

FA *So a layer of images?*

J *Exactly, and the area highlighted in one shows the arteries and the blood that basically supplies the brain with oxygen so these bright white areas that you see I the head and the neck and obviously down towards the heart are basically pressurised vessels and that is why they glow white as they feed up to the brain, now on the left here we have basically the same piece of data which is then reconstructed and I have intentionally digitally lit it and provide camera views and then I've edited these together into a short sequence so it is the same piece of data but in a different, obviously in a represented way, so I'll give you a few seconds just to, feel free if you want to ask any questions?*

FA *Well I was wondering about you saying you have taken some extra pictures so you used additional material?*

J *Not really, I mean I may have gathered reference materials about the anatomy but over and above this is the start to get this*

FA *Okay so you have just contextualised it visually?*

J *exactly and these are almost like if you can imagine taking a plaster cast, a digital plaster cast of the outline of these white bits has then helped to build this outline which then has become the 3D object.*

FA *Okay that is clear.*

J *Okay I've got four questions for you and I can elaborate on them further if you feel they are too ambiguous and the first is, please describe in your own words these images so one or both at the same time, what insight they offer into the human body?*

FA *Okay in both cases?*

J *Yeh*

FA *You would like me to describe them separately or in relation to each other?*

J *Maybe describe them separately first of all, I mean the second question is related because I'm going to ask you basically describe the visual qualities of these images so if you feel that you want to best articulate how best they give you some insight into the human body to add any in any visual qualities you feel provide that or don't provide that?*

FA *Well what I think is quite visual of these images in some stages I the early stage of the image when you are not sure only of course you have given me the information it is the human body so slowly it turns into a shape that you can recognise as the human body so in the early stage probably a lacking of some visual information to determine exactly what it is, but from so long you realise that it is the human body, more or less realise it is also the back so it is not clear that they are slices but certainly you told me they are slices but there is obviously movement but from up to the top down and it is quite morphic and after a while it is more less shapy and more into kind of developing especially the white area, the two bigger parts so you start to realise that maybe the white areas are quit relevant in this. So you want to know the visual quality of the image is not really clear it is quite abstract especially with what I described earlier in the early stage it is not really clear it has a quality of a cheap photocopy image*

J *It has got a lot of artefact*

FA *Yes and it is like looks like lobes so it is a very graphic quite nice actually, beautiful bit it doesn't give myself the position of the patient, not a lot of information so I need a lot of additional information to understand what this is telling me this image, em I said before this could be art because of the level of ambiguity in the image so it definitely a nice aesthetic quality to it, okay*

J *No that is fine*

FA *This one to me seem far more realistic from the beginning and I probably don't know exactly what it is but the object of the show as it were is visual*

quality probably also knowing the colour first a realistic colour so that is from my point of view a more realistic quality in terms of representing.

J *Do you feel that the interpretative image or the image that is rich in colour content although it may have some degree interpretation as it is not 100 percentage due to the scan data do you think that has less integrity or more integrity or more integrity because it have a degree of interpretation or is that not a fair comparison?*

FA *No I think it is difficult because when you look at this how much integrity the scan originally were, maybe it is just the technique this result of it and the human body so I would say if you needed integrity and ethical issue then I would say it is hard, probably best close to what I would call*

J *The 3D one?*

FA *And because think this is more detailed than this ad also you see the bits and pieces so there is far more detail in the image and probably will enable a patient to the extent of the image, so I would this probably is*

J *Do you think there are any other kind of attribute Edwin in terms of this kind of structural and symmetrical form or do you think it is spot on or does it give you understanding of the just the structure?*

FA *Well actually if you could compare first of all this is very two dimensional and also you have to put yourself in the position of trying to understand or imagine the layers so you have to travel through the body and then you have to do more basically to construct a three dimensional image, I think this is far more, so it enables you very much quicker to get to grips what it could look like inside yourself*

J *Sure and another question linked to that as an artist yourself do you think that me the artist and I won't be offended so say what you think, do you think I have enhanced or diluted the data or is that not a fair comparison?*

FA *Well if you would say not in terms of data but maybe if to an extent or does it allow to an extent that inside your body then I would say yes so it probably enhanced or improved my understanding of anatomy absolutely so I think in this case you could see that is it really good as a mediator with visual experience*

J *Okay good*

FA *And even as a computer image even if you don't know it is quite fascinating to be honest.*

J *It is hypnotic, I find it quite of hypnotic, it is really sculptural.*

FA *I think if you, it is really context related and if you take that out of context and don't add that information where it is coming from and how it is going to be used then it could stand on its own as visual interesting images but of course it is not your main objective I suppose.*

J *Well it is funny because it is funny because I think it is becoming more of an objective because I'm sort of moving beyond because I am sort of moving*

beyond because I actually selected this image because this image is from healthy patients and there would be no reason so show a patient this image so it is almost like I'm starting to seek out form and structure rather than seek out images of disease it is almost that you just become a conduit for making, for public understanding of science which I feel isn't really what an artist is about and that

FA You become an illustrator

J Exactly and I think you shoot yourself in the foot in some ways if you, I mean that has its context it has it value it is, I don't know this is probably a cheap analogy or a cheap but in some ways but some of the famous artists in history, traditional artist painters worked for the church although they may not have agreed with the church that was their biggest benefit to it and they did what they were told but they also kind of did other work and also made other things but mainly they had to produce work for the church to pay their rent and it is almost like we have become we are moving, I'm moving in and out of that kind of mindset, I mean I'm not comparing myself to Leonardo Da Vinci or to Michaelangelo but

FA It is really interest problem especially in research and practice because we worked on a project at the Scottish National Portrait Gallery and in the initial, in the development stage we have work which Chris Whatley and he is presenting his book on Thursday about the union so he approached us about us as traditional artists because we didn't want to illustrate a book so we first demonstrated to turn it into real exhibition and then we decided to film this image and not the original and filed really close up so we tried to develop or use a source but bring it much further and also create something that is far more open ended than the

J Yeh it is almost like trying to distance yourself the absolute and give yourself some sort of ambiguity and cushion so there is room for interpretation rather than just purely spoon feeding which we are all quite used to

FA And I think what is really helpful in the research he had done and given us in the early stage has helped us to understand and contextualise the way we have connected to related to current issues that are still really relevant and so that works but it is a discussion you have to go through and you have to develop it

J And you have to kind of stand firm as well

J Absolutely, it is a struggle

J Okay I want to kind of slow things down in terms of the reflectual because obviously they were two moving images and this a static from that image sequence and I just want to put up some stills that I have worked on that are based on the data again but I have built in some further interpretation which has built some ambiguity into the work but also it stayed true to it again this interest |I have in the structures and harmonies of this kind of internal body space but I have provided again is something that is cushioning but I want to take you through four images I'm not saying anything I'm just going to go through them and then we will go back and talk about one particular one but I'll leave this just up for context. So I'll start with this one Edwin because I think this one maybe highlights what I'm trying to say and maybe, I will ask

you the same questions again but fell free, the first question is linked describing in your own words what insight this image offers of the human body but also describe the visual qualities that it adds and obviously you have got the previous images you have to compare, I mean what is your thoughts on this initial

FA *Well you see, I suppose the detail and also in a way you feel it is like a photograph and show the bits in and it blurs the detail, for me it is less compact so it is only a feint element so it is more removed from the informative qualities, with presentation it has really moved from maybe where it is coming from*

J *it is interesting that you say it looks like a photograph because in 3D graphics that I work with, 3D computer visualisation that software is designed to make everything look real, it is not clever enough to function within the real world parameters things that are further away it won't instantly make them look further away and you have to actually build in the errors of the real world so in this case I have added an depth of field in to give it some sort of a discourse or an asthetice language for some people to hook into that may create an emotion and a response and obviously it hightens the realism in some ways*

FA *Yes but by framing it, it is almost balanced, because I think what is clear and the other one somehow because you see more probably so now you are not totally clear with that scale and the point of view is different*

J *I think as well, the thing that attracted me to this particular, was the symmetry as well and structure in something that is invariable organic it is now you do see some symmetry and structure and you find it in something so close to home as a blood vessel in your body although they are kind of symmetrical you see it inside, your used blood guts and gore you don't see any beauty it is almost hidden and not really reflective of*

FA *You are distracted, it stands on its own now, it is removed from all the stuff but I think in term of trying to explain something about the human body it works in sequences you have seen the other one first you focus on this particular bit*

J *Yeh you are probably right it doesn't work on stand alone*

FA *No you would need additional information*

J *Like a collection it works like a collection rather than stand alone, do you feel that this interpretation has less integrity because*

FA *Yes I would say it has less integrity in terms of getting information and representing what is really going on, maybe it is not really but it is your interpretation.*

J *And do you think from your point of view as artist you feel that the data has been enhanced on diluted in making a scientific start point*

FA *I don't think enhanced, it is so ambiguous*

J *Yeh it is almost like, I'm kind of finding this with other people as well, people say has it been enhanced or does it have more or less integrity and people*

say well it depends what it is for, it depends what context it is in, if it is in an art gallery it probably has increased its integrity but if it is for a patient to understand you have probably lost them and so I suppose

FA *No in terms of if you start here from a medical context and move then I would say you loose integrity, but you can argue if that is a problem*

J *Yeh definitely, it is very, I suppose this is part of the reason we are covering an experiment today, that is part of the difficulty of trying to place work, when you work across disciplines you find it very difficult to place what you are doing, you are existing in the middle ground two*

FA *You have to deal with different sets of understanding almost and language and also intellectual I suppose*

J *Well I have found with the scientists that I have interviewed it has been like drawing teeth frying to get them to talk about what they are visually looking at because the instantly try and do is try and describe what they are looking at in terms of its structure but they don't get into any conversion into poetic discussion about*

FA *They try to read what they see and translate it to their language*

J *Yeh and so it is very frustrating but what is also interesting about the arts point of view we seem to know to converse in both we seem to have gained enough knowledge, well I suppose it depends on the artist and it depends on the scientist*

FA *Yeh but what I think is quite interesting to see the artists because what they need, they do information knowledge and it is not only about I can make a nice paining or whatever, I am really good at this medium or this technique you need to be informed because the images has to have conceptual qualities or your work so that is quite interesting I think, because we have to read about Scottish history because you need to be informed because otherwise you can do really stupid things so it is quite interesting, quite generic, you need to be quite generic I suppose, an artist.*

J *Okay so this is the next set of images, this is a kidney and this image the third on the side screen and again it is an MRI image which was done in Dundee at Ninewells and again is a cross section of slices of your chest area and your heart area from front to back and back and forward and again not across time but across one point in time and the reason this scan was done was because it was looking at diagnose, well it diagnose a vascular condition called renal artery stenosis and this is a serious condition that occurs when the vessels that feed your kidneys become blocked and narrowed due to a build up of what they call tedoplaque and this may result in surgery or further investigation or whatever and you can actually as you scope through it and you look at the kidney on the right and look at this very small pinch, I'll show you, so you see on the right hand side there is a small pinch or a bulge that is the condition they are looking for which is a sort of lack of blood getting to the, just an arterial build up which is a result of heart disease due to bad diet, genetics and too many cigarettes so it is all a knock on effect but can cause kidney failure and this is the same piece of data reconstructed although I haven't concentrated on the diseased area I have concentrated on the structure of the kidney*

FA *So this is one kidney?*

J *Yeh from that scan and I start of with looking at the first one please describe in your own words what insight these images offer into the human body?*

FA *Well this one of course we know it is the human body and you see the symmetry and it takes a while to understand which part of the body is showing, even longer I think, if you don't know the human body that well you start to guess so it takes a little longer and again from an aesthetic point of view I prefer this one because it is harder to find the information so, well this is the same quality as the one you showed me earlier on kind of grey, black and white it could almost be drawing a charcoal drawing so there is a lot or artistic qualities in the image, but again you have to do more to get the kind of three dimensional idea in this case the kidney, the kidneys, if you look at the other one where again the three dimensional first will show it and the integrity thing and I mean the realistic quality it gives the impression that you get more detail so in a sense it is more information in this image than maybe that image again a really beautiful image, a kidney, perhaps my kidney and totally emotional thing as my father died of cancer and his first cancer was found in his kidney so there is an element that certain bits I am even more curious to know and of course this is a still image so I wonder if you turn it to three dimensional I think there would be more information but all the, this is how it is placed and in context*

J *The broader vascular system. In terms of its integrity then do you think it has got more or less or different?*

FA *I think it would probably have more integrity*

J *The 3D one?*

FA *Yeh*

J *And do you think it has enhanced or diluted or changed the 2D data, do you think it has enhanced it?*

FA *Yes I think yes, in the way they tried to show the body in slices it is quite complicated I think if you are trying to put the pieces together and to create an image of, a 3D image of the kidney that it helps.*

J *Okay, again I'm going to slow things down and pick a static from that sequence and I just want to show you a second image and it is kind of very different interpretation and again it is using digital lighting and texture in the composition but I've lit in a very different way, more sort of abstracted and art based reasons you know, I just want you to have a look at that one*

FA *This is a 2D image this is not a representation of a 3D object?*

J *Well is it a kind of, it is a two dimensional image in terms that it has been projected because it is that kidney build in 3D and then I've re lit it on its side and I've put it on a much more global illuminated and added a very different kind of texture it is much more absorbent and reacts differently in the light compared to the very sort of shiny, it is almost plasticy I feel it has got much more sensitive in almost a reflective and in some ways it is dead it is definitely not live it is almost like removed from the body and some of the images I produce, I'm giving away what the answers I want you to say.*

FA *Well its quite interesting, the first question is it a constructive image,*

J *real photograph??*

J *Yes*

FA *And I could feel the likeness I expect it is enhanced or whatever you have done something with it but of course there is a kind of effectiveness here and here of course as you describe it is smoother and of course it give it a really interesting tension, a really nice complicated sculpted object.*

J *I think that kind of reason was why I wanted to make it feel sculptural and kind of address it, the kidney is a beautiful organ the body is so dependent on them and it is almost that you need more time to look at it*

FA *Well I wouldn't recognise it as a kidney and it is almost like bone, it is sort of material is totally different kind of feel to it*

J *And it is interesting this is the kind of response I'm now moving to where I was interested in responses were more about oh yeh I can get it that is my body that is my kidney and it is almost like an emotional appetite there is emotional need that human beings also need to have and have it nourished as equally they need to have their nourishment and they understand oh yeh that is my kidney and they need to know where that is and that first image that I showed you can provide nourishment for that one perhaps but there is also a kind of abstract and a kind of need for poetry and a poetic, well all understand but they need is as much in sort of patient and in the sort of clinical sense but they don't know why they need it they don't know how because the can't measure it and can't place it, it is almost like a*

FA *And with having these objects for real that people can touch them and hold them you could deconstruct the human body in sculptural form and maybe remove the colour like and it could have a good experience of their own body*

J *They might respect it more as well I am keen to create you know the fragility in all the stuff that I do is that if you dropped it it would smash it is not a robust object.*

FA *Porcelain? Light but really fragile?*

FA *Yeh really fragile, it is quite interesting and beautiful, can you imagine deconstructed human body and in white porcelain, I can see that it could help the understanding of the human body by representing it in manipulate in sculpture*

J *Yeh none of us use it to create it so that it is dirty or broken and people especially in Dundee do not look after themselves as you see the people and there is a lack of, I suppose it is easy for me for a middle class artist point of view to say if you don't look after themselves but equally there seems to be no mechanism to make them feel bad about what they are doing to themselves equally*

FA *But you see now people because it is coming from the wrong direction of course and it is becoming almost class thing*

J *It is coming from lots of people with money like Jamie Oliver it needs to be coming from people with no money and you can show that it does work for them.*

FA *Are you originally from Dundee?*

J *No I'm from Edinburgh, my mum and dad live in Edinburgh, I was born in Switzerland actually but we moved to Edinburgh my dad is from Edinburgh so we lived there.*

FA *Are your parents both Scottish or British?*

J *No they are both Scottish but they just worked abroad quite a bit*

FA *They are not doctors?*

J *No, not at all, they both don't look after themselves either unfortunately that is probably why I'm doing this sort of work. It is funny though when you spend a lot of time with doctors because I think I used to have a kind of awe of doctors and a kind of, they kind of fascinated me and it was good to do this project because it dispelled a lot of myths that they are infallible they do make mistake, they are, there is a lot of guess work and in any large organisation like the church, universities whatever it may be it does have its problems and doesn't work well because it is full of human beings who have, even though there might be doctors intelligent they are also egotistical they like their*

FA *Status, the money*

J *Exactly so there is all those sort of issues that are wrapped in that makes healthcare much more complicated issues than just the cut and dry world that we probably I thought of*

FA *I remember my parents had the old fashioned kind of respect for doctors and of course it was a class thing as well, he knows, he is like almost God.*

J *I think it is almost like a generational thing as well people can perceive medicine was going to fix all the problems and they are still holding onto that dream but now it has reached the point that it is not making progressing as quickly as it used to it is not making the huge leaps*

FA *To the source of the illnesses, profession is much more important these days*

J *Exactly, it is funny when you speak to a lot of the diabetic doctors in Dundee they just have ran out of solution solutions to deal with this pretty much epidemic disease of the first world it is because people don't listen they don't take their medication particularly in type 2 diabetics but not type one where you inherit it and often have to take insulin on a daily basis but more to do with the lifestyle and I think northern Europeans are more like to get diabetes due to their genetics for whatever reason and so there is this kind of onslot and they are back and they have tired it on the drugs and the tools that they have and now looking for other tools and trying to widen every gap using he media now using*

FA *Absolutely it is on the offensive.*

J *It is a really refreshing area to be in as an artist but you can't criticise them you do leave yourself open to a lot of flack from other artists who feel you just illustrate it you have to constantly fight that battle.*

FA *But I think it is very interesting how you describe basically your developments, so in the beginning you were a very different kind of position in it but now you are developing it in more knowledge and understanding, and understanding the possibilities you come up with questions in relation to artist freedom and indeed are you a servant or what is your space for interpretation but I think in general it is not fair for colleagues to talk like that because how many artists do you commission these days and how restrictive are the commissions and how often do they use formats in that respect, but I have respect for people like you who really try to use their skills and enormous social relevance in your work and I think we have not talked about that and I think that is rather interesting part of it how you use your artistic skills in terms of maybe improving things and it is really political almost.*

J *Yeh, I mean they call it they have this Holy Grail that they all want and you hear it in modern medicine if you do like the residency approach that I had, you won't feel it is the arts context and get work thrown to you, you almost like to spend a residency with them and they call it this change in behaviour that is the Holy Grail, anything that you can do, they try drugs to change behaviour and they try advertising campaigns, they have various tools that they use for this kind of change in behaviour, but you know the biggest problem is all the change in behaviours is almost based when you get involved in healthcare, how many people spend time in healthcare, they only spend 1% of their time in healthcare and 99% is like at home with family and friends and who do people listen to, they listen to their families more than they will listen to a doctor, they will listen to their partners and I think that is where they need, and this is another issued the concept when you become pregnant and you go and get an ultrasound done and they give you an image and that image acts as a social devise and I think as artists we could really tap into interaction that an image provides that gives you the conduit to something hidden in your body because that is what started me in this project this is sort of like a power of that, it is now into the discourse of discussion and it is in popular culture and you see these images everywhere of little tiny dots, ultrasound dots of babies and if I could tap into that, even half of the power of that kind of type of interaction, you know what I mean*

FA *Yeh*

J *Almost like we have this space in our bodies but we never see it unless we get cut open and we don't want to see it, or we watch ER quite a lot which isn't reality and CSI, so anyway sorry*

FA *But the fact that it is black and white is that because of the tactical limitations or is there other reasons?*

J *It is to do with two reasons I think, I wouldn't say I was 100% expert with what I gather it is black and white to gain the biggest amount of contrast between the high signal areas and the low signal areas so it gives you the largest amount of range and it is easier to read for the clinicians and basically the machines they measure, but this one is different this is actually not an MRI image this is a CT images and this is measuring absorption of x-rays so this is an x-ray machine basically that is taking slices so obviously as an x-ray*

passes through different materials it generates a different value when it reaches the sensor at the other side so as it fires an x-ray through you it goes on to a plate and dependent on the speed it records different values so that is effectively what those are and it is really just to replicate the grayscale range so that is why it becomes black and white. I mean it would be interesting to know if there has been any research into using like orange and blue, complementary colour

FA *Yeh, I'm also wondering if this had been a period you did want to show this to patients you didn't want to be explicit or maybe it has been recorded on some document and maybe that is all that is needed to change the idea in terms of information and knowledge.*

J *Okay this is a CT scan as I said and it is of the aorta which is the main blood vessel that goes down the centre of your chest feeding you heart and it is a highly pressured vessel so it is quite critical if it becomes damaged or broken or distorted it can cause big problems and this is a diagnostic set of images to detect the condition called abdominal aortic aneurysm, which is basically a bulge at the bottom of you aorta which is really dangerous which basically means the wall on your aorta is weak and it bulges, it is thin and if it bursts it is highly likely that you will die on a few minutes unless somebody can get to you very quickly and perform surgery to save your life because obviously that is where you haemorrhage quite rapidly.*

FA *So is it really common?*

J *I don't know how common it is but it is a result of heart disease basically and I think there is a high rate of it in Scotland, it happens a lot but what they do they provide a surgical intervention very quickly and they often spot these quite early because it will be in people who are really sick and already probably got heart disease and have heart trouble before, so they will have them in and they will detect these things quite quickly and they will often put like pieces of metal along the outside or elastic on the inside to try and stop the wall bulging out even more and support it but the body usually rejects these things they don't last very long so you have to keep replacing these, so once you have got them, so basically the first question is the second image is that same piece of data and it has been reconstructed but I haven't coloured it I haven't textured it in any great sense I kept it fairly basic and elementary so it is a very kind of minimal amount of interpretation in that image but I thought that I wanted to keep the texture obvious, the geometry, so maybe the first question again is describe in your own words what insight this images offers and the visual qualities of each one*

FA *Well again because it is almost like an aerial view it probably takes a while to figure out what it is and again it is kind of a series of slices, the visual quality is more or less the same as the previous two.*

J *These are slices coming down as well*

FA *Em, well it doesn't give a lot of information especially if you don't know what it means when it s white or black or, so it is probably something the doctor will understand, strange to read these images and understand visual information for me not being a doctor doesn't say a lot. Looking at the other one first of all the instance of realisation of where it is from you recognise it, it locates the sense of placement, it doesn't mean that I understand it but I think again it*

gives me the feeling, the impression that I know more about what I'm probably looking at, a recognition.

J *I have another couple of images as well of the same piece of data.*

FA *Yes it is definitely closer and a different angle but still there is quite a lot of information that you recognise but it is a little more abstract*

J *Again straight on on the black, do you think that these images have got a fair degree of integrity compared to the original scan data?*

FA *Yeh again it is not an easy judgement but I would say again it does.*

J *I'm conscious of time so I'll rattle on to the last set of images and these are a set of animated images that have movement in them and these are slightly more complicated to describe. Now the image on this screen here is a cross section of a heart that was done in Perth Royal Infirmary last year and again it is a cross section but instead of being sliced through this is one slice through over time and it is a reflection of the real thing, the pumping of the heart*

FA *A kind of slice here*

J *It is one slice but it is almost cuts something open and you just watch a process of slices going through and this one here is quite complicated to describe but basically I've used this as reference and I haven't taken the data from this I actually watched the movement and observed it and studies it and translated it through my own interpretation into this flow of red blood cells moving through the aorta this blood vessel which the aorta or the tube it is in is actually taken from another piece of data and I've used another piece of data and this reference is try and build a much more rich image, so I've almost been a big like a magpie and I've taken bits and pieces from different pieces of paper to try and tell the story how blood moves from this fairly inert and sort of dead looking tube that comes the scan into something that has a bit more life to it, obviously these red blood cells are not reflective of reality*

FA *And the shapes are they more or less*

J *The red blood cells are a kind of similar that*

FA *And also the density*

J *The density is probably not reflective because it is I mean the red, it is interesting because obviously blood is made up of millions of particles but they are so small you can't see them and they look like a liquid so I've tried to sort of get rid of that to try and look, because if you look inside the aorta you wouldn't see anything it would just be the blood pulsing through so it is trying to take a slightly different approach it is not saying we are purely tied to scientific data here we can actually take bits and pieces and combine it with a level of understanding to tell a story, but also not tell a story but just the general rhythm and flow of the body, I think that medical scans in a lot of this stuff that is done is so dark and almost embedded in science, again this is an issue of exploration of the inner space, although I kind of have to say it does look a bit Disneyesk it does seem a bit bright and happy and Early Learning Centre orientated, so it is not quite as aesthetic although this was done quite some time ago so it is almost like the stage before some of the stuff you see*

FA *It is really elaborate, to creative, it must take a lot of time*

J *It does it takes a good couple of months to get something like that image and sequence because I have not got a, obviously I'm not working for a studio who got a lot of people and a lot of money, if I was working for a studio doing that I would probably do that in a couple of week but because I'm on my own it takes a bit longer, but it is interesting this process of these particles is not generated through individual moving each particle and then taking key frame it is done my assimilation process so it is done by typing in, I've got artists tools to do it but to take off, if you open the hood it is basically a mathematical calculation that you use, so you leave it for a couple of hours and it will calculate how they bounce and how they move, just based on maths because it knows, it obviously the interface is done for an artist and just change knobs and trying different things.*

FA *Does it use factual information?*

J *It does it used sort of physics based engines and it knows if you put in how hard the wall is, how far you want things to move and what you can do and what I've done is I've put like different fields in there so I've put in there, you can't see them but there is like little giant fans going round but they are invisible when you render but they are actually there to push the stuff through and they go off*

FA *Yes, how you get the movement*

J *So it is almost like I actually just put them, I mean they are designed for the, in studios they use them for creating rain and wind and I've used them and I've just put them inside this vessel and told them to turn on and then turn off and then turn on really far and then turn them off so*

FA *Maybe you do a lot of investigation in different areas to come up with solutions to this, so I have the right software and just do it you have create your own*

J *I'm a bit of a magpie I just find bits I need I am not technical in the sense, I don't particularly want to waste time in developing new things in terms of, I just want to create a visual in whatever way I can through sellotape, duck tape or everything I can find digitally I just do it. So the last two images here, these are the last two, it is quite a complicated DVD but it is the only way I could do it. These again are two images and this is of the aorta and this one is of the aorta and I'll just get you to reflect on the visual qualities and whatever*

FA *Well these are quite interesting to compare as this is in the aorta and the right hand may look from an outside prospective so I think it is a bit different, again as am image mainly black and white, pretty photocopy quality and no movement just an image you don't have additional information it doesn't say what, the other one is also a still image but of course I've seen the movements, it gives a different kind of information*

J *It is difficult to make a comparison*

FA *Visually in this case it is quite spacy interesting although it is really an enlargement of something that is quite small and complicated, it becomes quite really spatial it is visually I think quite interesting and of course at the end of the tunnel, light which is almost ritual kind of connotations, that is probably confusing in terms of information, it is an interesting image but of course the others are three dimensional*

J *I mean these images are kind of built again they are not really coming down to one piece of data, it is sort of interpreted from several bits of data, I mean there is another one here, the last image I want to show you and again this is taken from the aorta taken from renal artery stenosis into the kidney blockage but interpreted in another way*

FA *But is give more information and also you are more or less the same point of view you are not the tube you are outside the tube so it is good to get the comparison and gives far more information in that one, it helps you imagine what it is like.*

J *I mean do you think this one in terms of its integrity has got less or more integrity because it is made up of different bits?*

FA *Well to be honest this ??? information so I would again say ??? it has more integrity or yes still*

J *So you think it is an enhancement of that one?*

FA *yes absolutely and it is probably of course, it is not the kind of direct three dimensional presentation of that one so you had to put in additional information to help you imagine what is going on, I have no problem with that.*

J *Good, well Edwin that is that bit finished so we are just going to go back over to the other side and we will just finish up with a couple of general questions. I mean we have already talked about this Edwin I just wanted to show you some of this stuff. I mean this is fairly play school stuff and in some ways you will know all of this but to give some background to some people who are not maybe clinical staff, they don't really understand all the process that are involved to make that, this is giving them a bit of background and this was explained that when you develop new work or new 3D work it is not just about translating the data off the machine and then adding some colour there is a kind of interpretation process and it goes on and honestly it comes from different sources and not one source so obviously there is anatomical diagrams that are added to it and these can be both contemporary which is like this one from the medical school but it can also be historical and I've kind of tapped into quite a lot of historical stuff to try and just probe into historical of the artist and reflective of the human body and often in the past I'm very much in political or, this is a really good book*

FA *Can I see this one, a reconstruction of his face so I've been*

J *Yeh but it is interesting that a lot of these artists were having a jib at the establishment for using criminals as they often dissected a lot of criminals and often hidden in these images were kind of like quite subtle but quite telling images of betrayal and double standards particularly the iconography, it is quite sophisticated and they give you some articles as well, I think you can get this in the library.*

FA *I'll order a copy*

J *Anatomy acts as well and then you have got things like this entering into mainstream images and I've also got things like, they are actually coming to Dundee this exhibition*

FA *Okay because I know Andrew*

J *Oh do you*

FA *And I know about this show but I've not seen it and I've not seen*

J *I wouldn't mind meeting him*

FA *He is really nice, but he is a curator and a researcher, he works for Edinburgh College of Art so he is, he comes from the art perspective he is not a medical person.*

J *I was very driven by the arts you could just tell the whole way it was created and managed and set up, it was more about that than it was about the science to be honest.*

FA *Yes so it was beneficial*

J *Beneficial and obviously this thing of light as well this kind of process of mediation there is emails and drawings that go on between and the clinicians and there is a kind of you know, they tell me where I decide where I think it should go and so it is a kind of almost like family thing developing the project and also tapping into these, these are great these books, you have probably seen this book, and there is all this sort of celestial references and I think they are fantastic but not just that as I often feel I am on this voyage of discovery and*

FA *Well I think the last image that you showed kind of almost spacious quality, it was almost like when you time travel and things like that and it is quite interesting*

J *I mean things like this as well is happening and there is not much difference between that and blood vessels it is almost like the natural almost replicates what is happening in the human anatomy, what can apparently be linked by our own structures and mini structures, it is kind of micro scale and this is the macro scale. I mean obviously we have to synthesis the images they have been set and inscribed a certain way to look like something else but again that obviously is an abdominal artery, I mean that is probably done and then obviously there is like em you are fascinated by work particular by the Dutch Artist Vermeer with this kind of Vermeer light stuff and it is a really sophisticated way of dealing with a subtle lighting and I mean it is a cliché and it is almost a cliché in images in Vermeers light you use time and time again his approach to*

FA *You have seen Vermeer's real*

J *No I have never I must see them once.*

FA *They are amazing*

J *How big are they that what I want to know*

FA *They are small*

J *Are they*

FA *Yeh*

J *It is really interesting I've read a couple of books on Vermeer and he and liked this approach to work and obviously he did a lot other stuff and his stuff was church patronage or some sort of patron funded what he did but apparently the guy who actioned his will was the inventor of the microscope and so that the use of the camera obscure which whether he used it or not is still kind of, but it seems funny one of the high use of optics and the optics almost like the clarity of the optical approach that Vermeer adopted was almost ahead of its time, it was almost like a ??? and obviously I liked them to Caravaggio he was the same, using digital media to build up the sophistication of light but it is very difficult to achieve as it takes a long time to achieve this*

FA *So you do this on the computer*

J *Yes in three dimensional so you apply a global lighting scene and you have to apply the shadows but often the shadows were not right and I have to actually tell them to make the shadow to make it a different colour than it usually is as the computer is really stupid it doesn't realise a lot of it was just light and also the material the biggest problem with 3D is you can't specify where the light hits and bounces straight back and looks like plastic so you have to get it to diffuse and most organic material has several multiple layers to you go through one set of skin another absorbs lights at different rates so that is why computer graphics when you watch a lot of stuff on CG you know it looks CG because the light is just not right so you almost have to fudge this to make it look like it is absorbing and diffusing it is called the technical term is call sub surface scatter which is great when it is called tripe S, sub surface scatter, it is the people that developed Shrek that used a lot of sub surface scatter stuff*

as they knew that shrek doesn't want to look like he was made of plastic they wanted to make him look green and organic

FA *Well that is right*

J *And these I mean the reason why I'm showing you al this Edwin and I'm sure it is this sort of issue of integrity as an artist you have all these influences and does it dilute your work, does it have less standing it is not about standing it is more about different types of integrity*

FA *If you talk about integrity you talk about in terms of artistic integrity*

J *Yeh*

FA *Because integrity of course you can approach from a different angles but if you have got point of view of art, I think what some people probably is an issue that the subject matter is almost given and it is determined by a lot things and I think this to a lot of people would be a problem but I have to say that for a lot of people it is more a design approach but I feel a strong, so strongly between the distance although I can ??? within reality I think ?? where I'm coming from in arts I think it is also really for along time try to diffuse the difference practice in the Netherlands sometimes almost the same quite similar so it is really about context so the notion is to be descriptive in terms of what you are and also things that like that is really important how you describe it*

J *You are right there is probably compartmentalising of creative disciplines*

FA *It is pity, and also I think kind of pseudo of intellectualism has entered the arts in the last two or three years ago made beauty itself it not relevant so all this classy intellectual concept behind it is okay if it work really well but in a lot of cases it is just shallowness, so I think it is quite interesting in terms of placing yourself but I think what comes out of the picture here working is quite defined and quite a specific environment and a quite specific kind of goal and in all images if you take them out of context or maybe alter then for a different context you ??? what I think why shouldn't you do both. Feed each other?*

J *I mean that is right I think it is this cross fertilisation that is important I mean this image here is quite interesting because it is a purely interpretive piece there is actually no scientific starting point in term of data, I kind of sculpted this from scratch although it is early work still I have not finished it yet but this is the kind of first stage, I've built a very much reflective piece on how the heart is, it is kind of like an illustrative piece and it is reflected in that stuff, but as I move that image on I'm going to go past the functional, it is interpretive in the sense that I have not used data I have used al these other pieces of information but now I have a good understanding of the body and all the bits I can actually work with digital play directly now I don't have to, I've seen so much of these bits and pieces I'm trying to get to get to osmosis a process I can just visualise it myself and in doing so and kind of having that resonancy I'm now going to start to move this on, so this is really the first stage that is why it is in development and I'm now going to move this and I'm going to explore movement and fragility and some of these issues that I talked about but using this kind of data is a start you are just using the data that we have actually extracted.*

FA Reconstructing it

J Another thing as well this kind of images these kind of scribbles and sketches which are really quite cool and some of them are some of these doctors can really draw, because they find it really hard to communicate with patients and they often use drawing to do so, it is not rocket science

FA And what is the doctors response to this image do they say well they are not accurate or

J They kind of almost constantly come back and say change this and change that and you are right they kind of have a, if I show that to one of the patients would they understand what they are looking at, they need something to understand but they also value and I think this is quite a good example it is a bit kind of undergraduate approach but this was a picture that I took of the ?? area in the Natural History Museum in New York and this is the kind of subsequent reconstruction and you can see that the influences I have kind of make you pick out symmetry and form that, so it is not based out of process but it has a value and it is like trying to get people to buy in and recognise that value in the clinical context but also from the art side it is also, you are not devaluing yourself by having that, you are working with science, it is difficult I'm working in this place between two disciplines and it is often a very lonely place to be in sometimes because you never quite satisfy everybody

FA I could see the problems, I can see

J But based on that can we jump into these questions because I realise we are kind of running out of time actually, the sort of last questions are, did the images that you saw today affect the way you think about your body and the things that we have talked about?

FA Yes they do, yeh, and it is quite interesting because you use those type of images, a certain type of image but I think you clearly approach it differently and I think also I think what is quite interesting you have more sense of the 3D qualities and also it is maybe not completely true but it give a sense of realism that is a higher degree than those ones, these are drawings, so those images especially the ones you have shown today probably give me more information about what is basically inside myself.

J How would you define visual integrity in your own practice, what key words would you say?

FA What integrity is I think a really difficult one, of course it is related to almost like there is one way to do it, it is kind of predetermined likeness somewhere so maybe it is quite interesting in art but in many cases they are trying to challenge that integrity so the integrity itself is permanently attacked so that perspective I would say integrity, I think the person interpreting, for example we did projects in galleries and museums and we basically developed a kind of exchange with the audience we had a kind of temporary studio, we were working on, in this case blankets, text blankets and in the beginning we added text and those texts were taken from conversation with the audience and public and most time there was a kind of subject so we talked about a subject and we make notes and record it in different way, the responses from the audience, not really scientific or really structured way but loosely done, but then the people who contributed to the blanket text were chosen to go

onto the blanket will again use the blanket for a while so the blanket was a way of thanking and also a kind of sense of, although it is pretty much fake in the sense of shared authorship but there you have the question of integrity in terms of you allow people, they give something to you and then you use it to create something but it is still, you will sell in on for later and it may be used for a while but basically the power was clearly defined and we had total control in terms of contribution so integrity is an issue there for example, how do you use input of others in your work, but in other cases I can imagine that integrity has to do with the level of representation of suggestion of representation and I think that is probably the case in your work and it is also I think in terms of do I represent something because I want to create something nice or do I represent something because we need that representation to explain something, so I think integrity is really difficult to define in terms of integrity in your practice but especially if you try to work without what is maybe always expected from an artist and you challenge ways of working or you go beyond you borders and probably that question is often more relevant because there are no examples

J *Nothing to hang it on, okay and a sort of final question is what role do you feel an artist should play when working with medical scan data and although we have probably have answered a lot of this in the discussion and probably covered the bulk of it unless you want to add something it is fine but key words like translator, mediator, illustrator, based on what you have seen today what do you think the role or my role should be or per say what would the role generally be?*

FA *I think if it is clear that your role is using your skills, official skills you are, the information that you got*

J *Fantastic knowledge*

FA *yes and how you use it to create images but not necessarily reproduction or one to one representation of what you are going to show but I think it is real traditional role although you use contemporary tools and I think probably the whole issue of integrity has been there all the time and artists have always had a close relationship to the medical profession and of course a lot of artists were themselves doctors or whatever so especially in the past so basically there is a long history in what you do, but of course I think the values and we talked about it earlier on, definition of an artist has changed and probably that caused a kind of dilemma in respect to you practice, but I think it is rally valuable contribution to enhance understanding.*

J *One last thing Edwin which is dead easy it is a sort of fun thing and it is just what this blackboard is for, it is trying to chart what you, I'm trying a sort of diagram and I'm finding it harder and harder the more people I speak to try and quantify, it might not work, one is a linear diagram and one is a circular one and I'm just trying to build a reflection where the work sits and one has the MRS images and the other end has the arts extracted like the image of the arteries that was very blurred although I'm sure that sits there it is not quite abstractive in the sense of abstracted art and this is not the function within my project I'm not moving it outside of the main clinical area I'm working in but you have the MRI images and the MRI probably sit about here, they are not absolute truth, absolutely the way things look but they are a kind reproducible and then you have got slight interpretation and full interpretation and I think these images here I developed, the ones are close to what the*

thing looks like and the ones that we tend to show patients and then we have got some of the slightly abstracted images that are maybe slightly more blurry and not obvious what they are, are used for, so you have kind of got this linear band with and then the other area has these central points and we have got the images dotted round this kind of truth and an arts based truth and a scientific based truth so this is the kind of science one and this is the art one and sometimes you get the odd image that kind of crossed both boundaries, it works in the spot between the two and in the end these are the ones that are not quite art space they are not really abstract they are not really breaking ground but they are quite distant from their original scientific data but they have enough information and again these are the ones that are best described the kind of structure and the one we show patients but I don't know how you feel if that really describes like the whole, I mean it is grossly simplification of the argument almost

FA *Yes it clarifies the argument that is for sure and that is quite interesting and I wonder you talked about artists in the past even like if you could go back and in some cases the same question I can mention, but also ??? from a medical point of view from the work how accurate it was.*

J *so there is a kind of historical*

FA *I think there is really a historical complex for this sort of debate, but of course this one, if you use your technical skills you are using for the medical images you can imagine using the same skills and knowledge to create that are not related to medical purposes or even the human body so I can imagine that you could probably within your own practice use the same skills but with a slightly different subject matter but that is probably, the subject matter is probably the issue that makes*

J *So by moving this scale out, so we have it sitting in the clinical content but is it almost like the reason why there is such a contentious issue is because it is kind of an ethically sensitive area, but if we were to slightly apply a process and apply my skills or whatever you want to call it*

FA *If work out like art history like Henry Moore sculpture for example and I thin it could be quite interesting if you look at fashion, you take images of fashion from, and you would like to imaging, for example*

J *????*

FA *For distance far away culture or whatever so it is quite imaginative to recreate this into 3D and representation, if you move away from, because you work with the same subject matter then it is confusion I think because the ??? and also there is a function and the function is in terms of art, but if you moved away from that specific subject matter I think the probably the discussion would be slightly different*

J *It is almost like gunning visualisation of other things and representations of other things using the contemporary media, great that is really good*

FA *Helpful*

J *really helpful, I'll stop the tape*

FA Stop the tape

2.5. Radiographer A

Interview with Radiographer A
Date: 17/10/06
Time: 16:30
Duration: 01:11:17

J Basically what I'm going to do is I'm going to show you images on two screens, one is going to be the MR or the CT images that the images were built from, so this will be for the scientific data and this will be for the 3D reconstructions that I've have produced as a result and we I'm going to put them side by side and I just want to talk about them and I'm going to ask you a series of questions related to how they look together and sort of comparing them so I'll put this one up first and then I'll put the 3D reconstruction that has been built and I'll give you an explanation of what they are but I know you will know what they are but just for consistency. So obviously in image one this is an MRI scan taken at Ninewells hospital in Dundee and it shows a cross sectional slices of the head and neck and the area highlighted in white as you can see if the high area, the brightness is the arteries that supply blood and oxygen to the brain, the image on the left here, the 3D images is the dame piece of data that has been reconstructed and it has been re-textured, digitally lit and I've provided some alternative camera views and pans that have been stitched together in a sequence to form a loop and I'll just let you watch this for a few seconds before I ask any questions. So I'm going to ask you some questions, so the first question is, please describe in your own words these images and what insight they offer into the human body and happy for you to make comparisons between the two, maybe if we start with the scientific one and the second question on from that as the first two questions are linked is how would you describe the visual qualities of each one so maybe describe what insight that MRI image gives you and it visual qualities and maybe talk about the 3D images, its qualities and what insight they provide.

RA Looking at the MR image first of all if I was looking at that just now displayed like that it gives me an insight into the, I'm more looking at the overall sort of image and where I'm seeing the anatomy context with the rest of the anatomy, so I know straight away from looking at it even if I didn't know it was an angiogram I know I'm looking at the group vessels and looking at that it gives me an idea more of the calibre of the vessels I think and in particular when I look at that and kind of pay more attention to the origin of where the vessels come off and I'm looking at the vessels going up the neck but not particularly looking at anything higher up in the brain and I think when you look at this one as well going through you know it is a 3D sequence moving through it but when I look at this you are always remembering just what you have seen you are not always just looking at the thing that is front of you, I know it is in a loop anyway but whenever you view these images I'm always aware that this is image five of how ever many and I think this looks absolutely fantastic but the anatomical view of it or your 3D image looks fantastic, it looks really scary

J Just frightening because there is a lot of information or just because it looks realistic?

RA No it looks really realistic and it sounds a bit daft but it makes the vessels look far more important than they do

J More prominent?

RA *Yeh, the vessels look, well to me looking at the cerotic vessels I think there is not a lot of other vessels really doing that job and that is one thing, if anything were to happen to any one of those vessels it is kind of major whereas when you see that I don't know if it is because you see everything else you are not particularly focusing just on, if I look at that I will see an ?? or something in the vessel or something but when you see it like that, if you were to see one of those vessels in any way damaged then that will do*

J *Does it make it look fragile or just?*

RA *No I don't think it makes it look fragile I think that looks really strong but I think it just makes it look really vital.*

J *Do you feel that the interpretive image, the 3D images on the left do you think they have less integrity due to their interpretive style with digital lighting and the computer generated nature of them compared to the raw data from the scan or do you think they have just a different type of integrity?*

RA *I think in some ways it actually helps, I think not really comparing like with like in some ways because you would have to look at the mix of that, I would want to look at the, but I think in some ways it, I think to me it helps because when I look at this I can appreciate some of the relationships with the vessels more but I don't think that is anything false I think it is true, it is a true image.*

J *And as a clinician/radiographer do you think that the artist has enhanced or diluted the 2D data, the original 2D data from the scanner? Do you think I've enhanced it?*

RA *No*

J *Do you think I've taken that and turning it into that is a bit less enhanced it or do you think it has diluted it or changed it in a way that is negative?*

RA *Taken ?? here*

J *Yeh*

RA *If I was talking purely as me at work if some one was to show me that and ask me to comment I wouldn't be happy because that is out of my comfort to me, but I think if you put the two together*

J *So you think a lot of it is to do with context?*

RA *I think so, yeh, if I saw that out o context I think it is impressive and it is beautiful to look to look at*

J *But in your professional context it would have not really much relevance in terms of diagnosis but in terms of*

RA *It would but I would have to see it with that, no I think in some ways it helps because you see anything in that then you would then go back to those and perhaps look at other areas of that in more detail.*

J *The next thing we are going to do Lynsay is to slow things down and bit and take you onto to look at some stills and I'm just going to put this onto a still as well. What I'm going to do is like there is four images on this sequence and I'll put this up for reference and I'm just going to scroll through each one and then we are going to stop on one and*

just talk about it and the other four are part of a collection based on the same piece of carotid and various kind o blood vessels that feed from the heart up into the head so it is all from the same bit of data so I'll just go through them bit by bit and then leave then up for s few seconds, so I'll leave this one up Lynsay and we will maybe use this one to just go through the questions, the questions are just going to be the same for every set of images again for consistency but maybe describe in your own words what insight this one offers and its visual qualities, how it make you feel in terms of its structure and form?

RA *This gives me quite a good appreciation of the fact that vessels are quite tortuous which you don't always appreciate on an MR image*

J *What is your kind of gut reaction when you see something like that*

RA *When I see that just now?*

J *Yeh*

RA *I think there is, I don't know I feel there is something missing, I like the lighting I quite like the way that shows the curvature of those vessels at the front but apart from that I think there is something there but you are just not seeing it clearly, the sort of blurred images as the back, it makes me feel uncomfortable sort of thing I couldn't focus just on that bit that I'm seeing clearly*

J *Do you think it has a certain realism, it is too real or*

RA *I don't really know, I am thinking about just as the vessels I think, no that is kind of fine, just as I would image them to be*

J *And do you feel that the interpretive image has less integrity due to its obscure or abstract*

RA *I think so*

J *And do you feel that the data has been diluted or enhanced that is due to the fact that it has been changed?*

RA *If all I wanted to look at was that the vessel at the front then to me I think it has been enhanced because I've seen that particularly much more clear but as an overview I think it is losing something.*

J *So we are going to go onto the next set of images which are the kidney, which you have seen before. So I'll just read you the explanation of this but I'm sure you are well aware of what it is but the is the MR image again from Ninewells hospital and these are cross sectional slices taken from a scan and the scan was performed in the diagnosis of a vascular condition called renal artery stenosis and it is a serious condition which occurs when the vessels that feed the kidney become blocked or narrowed due to a build up arterial plaque this may result in a surgical intervention by the clinician, obviously the image on the right, sorry the left here is a 3D reconstruction of that kidney and it has been digitally lit and textured, so the first question is please describe in your own words these images and what insight they offer into the human body?*

RA *I'll start with the MR one, this is something we do all the time so it is like second nature looking at*

J *That is fine most people are starting like that anyway*

RA *It basically tells me when I look at that that I've got my timing right for the scan to see what sort of contrast in the aorta and I've timed it just perfectly when it reaches the renal arteries it lets me seek profusion through the kidneys and from that we don't particularly do this but I know there is a lost of post processing goes on for measurements and volumes and things and if I got that scan I would be quite happy.*

J *What do you think the visual quality of the 3D one and that one*

RA *Is this old when I look at that now it looks like something that I did two three years ago because I know our scanner has been updated and even our software has been upgraded since this so when I look at that I just know it is one of our older ones, the image quality for that time looks fine but I know that the narratives have changed quite a lot and the sort of platforms for scanning are different so I mean the information is all there it is not like anything looks like it is missing it just looks really noisy compared to what we get now and I don't know if you are probably scanning thinner sections now I'm not sure I can't remember off the top of my head what these old ones are but from the point of view, the image quality looks fine because there is lots of contrast there so for an angiogram it is fine and on your single kidney it is kind of difficult because I feel I've looked this one so many times and not seeing it for the first time*

J *In terms of its visual qualities?*

RA *I think this is ?? I do like it, I like the fact that I can see all the, all the aspects of the inner workings of the kidney which I can't really appreciate as much on that although I know it is there.*

J *So do you think their integrities are different, better, worse or just a different type of integrity from the MR scan?*

RA *I think it is completely different, I think on the, on your rendered image I look much more at the kidney on that whereas on this one I thinks its vessels and it has more*

J *And do you think the artist has sort of enhanced or diluted the 3D data?*

RA *I think it is definitely enhanced, well for me it has enhanced the data of the actual ?? but as far as the vessel goes I suppose on some ways you eye is drawn more to the actual kidney itself, that might be just actual projection*

J *This is another image that has been produced and this image is the same piece of data but it has been interpreted in a very different way using digital lighting and texture and a very different style of view and I guess the same questions, can you describe the visual qualities of this image and also whether it gives you any insight in to the human body in that respect?*

RA *I don't like this one as much and I think it is because it looks like a plastic model or something it doesn't look real to me at all, I prefer the other one as I can see the actual inside, is someone put that up next to the MRI scan I wouldn't compare the two at all I don't think and it doesn't make me think of any disease or anything it just looks like something that has been modelled out of plasticine, to me that one doesn't look like an interpretation of anything medical, it looks more like somebody just sat down, if I gave you a lump of plaster to shape the kidney or something it looks like that it doesn't look like it has come from anything real.*

J *Do you think it has got less integrity in that sense*

RA *I don't know*

J *And from a radiographical point of view you think the data has been diluted in that respect?*

RA *If you were purely wanting to look at the size and shape of the kidney I think it is fine but if I'm comparing it to an angiogram or if I'm taking data that I would be looking at from the out set*

J *We are going to jump onto an anuerism now, cheery stuff, so this image just in front of you Lynsay as you probably know is a CT scan of the aorta, and the aorta being the main artery that feeds blood from the heart and this is a diagnostic image used to detect a condition call abdominal aortic anuerism which is a life threatening condition that exists at the bottom of the aorta and the image on the second screen is a 3D reconstruction from that same piece of data and some basic interpretive colour and camera views have been rendered from that baseline data and again I'm going to ask you similar questions if you could maybe describe what insight this offers into the human body and how you would describe the visual qualities of this image or these images in comparison and start with the CT?*

RA *Oh it is a CT which I never look at any more, em, I like the CT image because basically you can see where the anuerism lies in comparison with all the abdominal organs and everything else in the abdominal cavity, I think because you are following it down all the way you can see how the vessel actually changes through its course down through the body and I don't think it is as clear on a CT but I suppose you see how an anuerism actually works and that sometimes it is within the lumen of the vessel and other times it is on the outside of the vessel you can actually see where the different layers are on that image I think, as for image quality it looks pretty*

J *And are you just gauging that by clarity and differentiation between signal*

RA *I'm just gauging it by you can pick out the different structures within the abdomen, I mean the patient hasn't moved or anything like that, the CT is so contrast then when we compared what we were used to looking at in the MRIs, much more black and white but if you pick out different structures of anatomy then you can't differentiate fatty bits from anything else within an organ, that one to me is like something out of a text book, it looks, I like it because you get a better idea of the size and scale but I don't like the fact that you are just doing it from that is basically just a 2D, I mean anuerism are always going ?? but always going on inside the vessel and you can't tell from that what pressure it is putting on anything really you could measure it and say it is such and such a size but that is all that you can do*

J *And do you feel this image has got more or less integrity than the original CT?*

RA *For two points of view, is somebody asked me to accurately say what course the vessel took, where exactly the anuerism was in a comparison to bifurcation things then I prefer that*

J *The 3D, yeh, there are some other images as well Lynsay I wanted to show you and these are part of again a sort of collection of images in the sense of a kind of side angle and we have got another sort of like photo again black, so it is all part of this sort of 3D reconstruction but it is very kind of minamalistically represented in some ways it has not got much*

RA I looks brilliant graphically but I don't think it looks particularly realistic

J And I suppose from a radiological point do you think this has then enhanced or diluted the 2D data?

RA Yes it has diluted it

J So we are going to move onto the last section which is called blood flow, which you have seen before, but not as big as this anyway, now we are going to start off with this one and I'm going to put up this one just to give you a bit of an introduction to this one, this is an MR from a MRI scan taken at Perth Royal Infirmary and it is a cross sectional slice taken of a pulsing heart to represent real time pumping of the heart and it is taken over time rather whereas the other ones and I won't labour on about that. The second image is a bit more complicated this is a blood vessel it has been constructed from an MRI piece of scan data and I've used the vascular heart movement on the right as a reference so you have kind of got a mixture of lots of different things in this one image and I've also added the red blood cells to describe the flow but again these have been added, these blood cells are not representative of the real size of the cells but are just a kind of visualisation to try and describe how the flow works, so this image is made up of almost like three parts, it is a vessel taken from an MRI scan it is a sort of representational red blood cells and then there is the movement which is taken from the reference material on the right, so knowing all this information of these two images could you please describe in your own words what insight they provide into the human body and some of the visual qualities of each sets of images?

RA The MRI images basically showing that I've got, if that was me scanning just now I would have a nice view of the left ventricle and I know purely taking that image to show the pumping of the heart and I think of that, well I think of that you immediately think of the left ventricle which does all the pumping action of the heart so I think that is a perfect image just to show that. I think the fact that you can actually see blood flowing in and out of the chambers and you can see the wee valves opening and closing I always think it quite nice, it is always a bit surreal the fact that you see the valves opening and closing and everything happening but you are never aware of it yourself, I think as well when you look at it you see all the surrounding structures all being vascularised with the blood and see all the vessels and lungs and things which again you never normally look at if you are purely scanning the heart but it is all there to see in the image and sometimes we don't look at it that closely, we are so involved with what we are doing it is quite nice just to stand back and see that projected so much, the image quality I think is great on that, it is quite a nice image and it that an honest, I mean have you done anything to that image

J No

RA That is just as is

J No it is just, it is not quite a cine loop, it is a cine loop and it is not, it is like a simulated the heart has taken the raw data and just put it in sequence because the ?? was quite small and this is like a full resolution from the scanner put into sequence from the original scan data.

RA And this image in some ways it is hard to imagine that it is a depiction of what is going on for me it looks so and it is an interpretation isn't it?

J Aha

RA *But is looks very sci fi almost doesn't it*

J *Sci fi, yeh*

RA *But I quite like it because it is so simplistic, I think if anyone thinks of blood they do think of red blood cells and I think just to have that is quite nice, I think that one probably gives a better idea of how, I mean blood is flowing it isn't all just going in one direction as there is a little bit coming back and you can appreciate that more in this one, the cells kind of move around, the blood does move around it doesn't just go in one trajectory the whole time, that is quite nice, tat is quite reassuring I think*

J *reassuring yeh*

RA *If I was a patient and I saw that I think it would be fine, but no it looks quite calm*

J *And do you think in terms of integrity they both have integrity but in different ways or one has more than the other?*

RA *I think this one has more integrity*

J *The 3D one*

RA *Yeh, I don't know if it is just that*

J *So I suppose you are not basing integrity on the fact that it is religiously linked to the original data you are basing that on just the visual impact of it in some ways r the way it moves?*

RA *well I'm looking at it, I can't ever look at that without appreciating that this is going on in the foreground so I think the two are almost linked*

J *So you would almost like trusting it because you know they are inherently linked to some sort of, whether it is a tenuous link or a link thorough data there is always something. Okay, so I've got two more images to show you and then we will go to the last half of the experiment, so image one, image two, so was image one on the right it taken from an MR of the aorta, one particular slice across it and then the one on the left is again a still taken from one of those sequences and maybe just talk a little bit about what insight each of those offers to you Lynsay and then the visual qualities of each one?*

RA *The MRI raw data basically there is no flow problems within the aorta, the aorta is truly visualised and I know when doing the scans look at the renal arteries so I can appreciate the right renal artery much more than the left just because we are cutting through the anatomy, when I'm looking at that I'm meaning you are just doing, well I'm just thinking of vessels when I'm looking at that because I know that know that we have already given the patient an injection so I'm automatically thinking of again calibre of vessels, has the contrast got there in the right time, have I picked it up at the right time, from these you don't well I don't particularly appreciate any of the other abdominal organs or anything. That is a pretty picture and if I just saw it I wouldn't have a Scooby what it was, in context, if I was looking at it in context today I know that it is into the red blood cells I guess because I know what this whole thing is about, I know that I'm looking at the inside of a vessel but if I was looking at it for the first time I don't think I would appreciate that as much*

J *Do you feel that has sort of less integrity or more?*

RA *I think the image has more in it but whether it is anything more useful what would be me looking at it clinically, again if I was looking at the two of them together it does add to it but on its own.*

J *Okay I've got one last image which is this one and then we will go and have a seat and again this might sound quite monotonous but what insight does this one provide into the human body and how would you describe the visual qualities?*

RA *Well I think this one has far more impact to me because I know straight away that we are looking at the narrowing of the vessel*

J *I mean this image is made up again a hybrid of styles and hybrid of data, it is the MR data from that renal artery stenosis but it also has particles which are informed by the flow, animation*

RA *When you look at that you can just see straight away that everything is bunched up because of this narrowing and that gives quite a lot extra I think*

J *What does it make you think when you see what see, what comes to mind? I mean you mentioned sci fi or*

RA *Sort of looks like a traffic jam*

J *That is just the particles that are making you think that by the little blood cells*

RA *Yeh and the fact that I can see there is, visually see the narrowing whereas all the rest, I know there is because there is no contrast but I don't actually see it*

J *And do you think that one has got less integrity or more?*

RA *I think this one has more*

J *And do you think the artist has diluted or enhanced the data he started with ?*

RA *I think that one is definitely enhanced just because I can appreciate the background of it much more.*

J *That is great Lynsay so that is it all over for the first part, now is the easy bit*

RA *It is nice seeing the images*

J *I know it really good in this space because obviously you have got natural daylight and I designed this space to be like this we kind of ?? designed it so it would be the best to induce the, for people to feel relaxed and feel they can talk freely about what they are looking at you don't want to be peering at a small screen. See this little thing here, this is a computer*

RA *That's it*

J *That is a Minimat they call it*

RA *??*

J They are not that expensive and you just plug a keyboard in and a mouse in and plug a monitor in, the monitor is the projector it is just ??? just compact and ???. So I've got three questions to ask you Lynsay and then we are going to do a wee something on the blackboard. Do these images affect the way you think about your body based on what you have seen in the past and maybe it is not so, do they make you think about anything, I mean you are probably so used to it working in a clinical environment, maybe you don't

RA I don't think they have changed, they have not made me sort of think, gosh I didn't realise that is what went on I better make sure that never happens, I don't think so

J Fine, so second question is what would you define as visual integrity in your own practice, how would you define?

RA For me at work, basically I need to, when I'm working I have to make sure that the images I produce, that I have not in any way done something that would either miss information that means that a pathology will get missed or anything and at the same time, sometimes when we are actually imaging onto hard copy film we have to make sure that we image properly as we don't add something that isn't actually there in the way that we are windowing the images and things so for me integrity is all about, you will maybe never get it 100% but basically what you want to do it show something as accurately as you can

J So accuracy is a key issue?

RA yeh and not kind of influence any ones, like if I imagine a radiologist sitting through at a monitor looking at it I want to make sure that nothing I've done has actually influenced what he sees, I want him to see

J So it is consistency and reproducibility as well, it is like if you image the same person twice you have to make sure that you use the same, capture it twice because they haven't changed

RA Hopefully all their protocols are set up so in the training such that such as if I did or Pat did it or whoever did it should all, it is never going to be exactly the same but to within a degree of acceptability any way.

J And what, this is a sort of general question and probably not easy to answer but I'll ask you it anyway, what role to you feel an artist should play in working with medical scan data and maybe give you a start, some of the words that have been used are: translator, mediator or illustrator, what role do you think I play in the job I do either what you think I should play or what role do I play?

RA I think the role or in my mind the role that you have been brought into fulfil is to try and make the imaging more acceptable to patients so that, basically to demystify it almost, because I think, we are very used to looking at medical images and to us they are just 10 a penny to us but if you sit down and see something for the first time, especially if added to that you are having someone explain about an illness that you maybe have which could be life changing to you, maybe not life threatening but certainly life changing you almost want the images to appear more friendly, it sounds a bit daft

J No

RA Because everything, to patients going through a series of tests I always think, things are quite hostile almost to them so if a doctor can sit down and show them images that to

them looks like something they have maybe, or not even what they have seen but what they imagine it to look like, everyone kind of has an image of what they think a heart looks like, whatever, but if someone can actually show them that and say that is what your heart looks like and this is where maybe something has gone wrong but this is what we can do to help, I think is just kinds of softens the whole disease business.

J *It makes it more accessible probably. Okay I want to show you some stuff here Lynsay behind on these tables and then we are going to just do a couple of diagrams. This is just to give you some insight into the process that I go through when creating images it is not just about translating the data because there is a degree of interpretation and there is a certain aesthetic that I add to it and how does that work, well it works in different ways, there is different inputs that I use to achieve the images which whatever perspective you ?? method that maybe degrades the integrity or it maybe increases it in some ways but they are very subjective and obviously I use anatomical reference with these kind of illustration books but I also tap into things like historical stuff, I also look into historical human data and illustrations*

RA *Is that because you always want to be moving on*

J *Well just to try and look at how structure and form has been presented historically to help me shade the work I mean a good example*

RA *But does that give you anything more than just ??? it up*

J *It kind of does because it gives me a different language, I mean if you look at that and you look at something like this, they have adopted a very different illustrative language there is different colouring been used and obviously there has been text added to this and obviously the body doesn't change but the way that the rendering has been done is very different to this and so there is almost like a visual language which is used that varies across different techniques but this visual language also inserts things like for instance spatial exploration there is a lot of black in it and there is a lot of black in my images as well and there is a definite composition and linkage this is a kind of satellite view from the air and this is the Mississippi Delta but it is interesting that the language of that and the way that looks has linkages to vessel data that I deal with, the way it looks and even the structure you can see the link and obviously that has been presented using this specific visual language so I kind of tapped into that but I also and this sounds really odd but I tap into things like this, this is this kidney image that you saw and a lot of the lighting that I used is influenced by lighting of traditional painting, a lot of it is particularly Vermeer and the way that illumination works in that way with the rendering and the shadow work and many of the shadows I'm adopted in the medical data because it is a really efficient way, obviously the kind of fine detail of that*

RA *Is that because it is tried and tested and you know*

J *Well it just kind of tells a certain story and it is quite sensitive and it is a style that I like working in and it is obviously when you are working with the computer in 3D it doesn't have any and you have to add all that, you have to add all of that you have to tell it what shadows you want, you have to tell it what colour you want it to be and what range and those have different bearings on the way it looks, do you know what I mean*

RA *When it is up there I appreciate that you put a bit of lighting on it*

J *But that lighting has a kind of theatrical style to it and that transparency is very kind of sci fi and light set up that way it is highly reflective surface with the reflection that I have put on so all that comes from somewhere so obviously it is a very known scientific*

approach to making the data more accessible over and above just taking the 3D stuff from the scan, as the 3D stuff from the scan is effectively just like taking the skeleton it has got no flesh on it, it has nothing and it has go no, in some ways you have quite a feel of viewing it, it is adding humanity to it basically that is effectively I'm doing I'm adding some sort of humanity but in doing so that makes it more accessible to the ?? and in some ways when you get, you can say this in Graeme and I say it to Steve and in your medical training you are almost like humanity it is not bound to humanity it is so subjective and neutral because it can't be because of reproducibility and that is good as that is a diagnosis but the minute you use something out of diagnosis you move into another and a new domain and you deal with heritage of what a is 2000 years of visual culture so in doing so you are finding all these other things, so even things like photography as well has a baring on, if you are taking kind of abstract viewpoints of the anatomy and I have been doing that internally as well, like the several arteries, they are just adopting that slightly obscure camera point to tell a different story and I'm using it a touch as well in live several images although I hopeless at it in a different way and the things that are really useful as well that feed into the mix are things like asking Trudy where these vessels are and getting Graeme to do a drawing and getting the feedback in emails these all, as much as this Vermeer painting feeds into it and a picture of a satellite image or the Mississippi Delta they all have a kind of feed into the mix and I just stir it round and then I pick out an image that I like

RA So when you are working on something like this do you not feel rally frustrated by the fact that you are governed by a sort of, basically everything is always put in black does that then really limit you, or do you not just see it

J I know that I can sort of like take an impression and remove it and get rid of that and I'm left with this thing that I can start with, this starting point so I can lose that now because that was the big stumbling block at the very beginning because I couldn't get it out but once I got it out then I can do all the things that you have seen and that is what gets all of that really interesting but the bit that gets really interesting is this bit it is the adding of these bits that actually enhance the data that change it and you can give it more humanity, make it more human and these are kind of digital pieces that are not ready yet but they are kind of work in progress and this is like the pulsing heart and this is completely interpreted it is not taken from an scan data I've actually built all this by hand which has taken me quite a, this has taken me a month just to do that and then I've used this as the reference point, this pulsing notion so in some ways I've getting to the point where I'm actually needing the data, I can actually make the kidneys and I can make the aorta and I can make the heart now from scratch and

RA Because you are appreciating the process of the anatomy of the diagnosis

J Yeh and in some ways

RA Its the ecology isn't it

J Well it is it is effectively what other visualisers do, I mean a lot of people that work in medicine visualisers do that they actually just build, they don't even have access to the scans and I have had the beauty of access to the scans so I think in some ways my work is maybe a bit of both because I then I've got a completely interpretive route that loses the kind of complex shapes that you can make, as you can never make those shapes they are so complicated

RA Sometimes the individual themselves, the person and their anatomy, you have got your text book but there are so many more variants that you can appreciate

J But it is almost like this question of integrity that comes up constantly because it you lose it and remove data from the kidney then you are in an image that has not bed in science it is totally down this Vermeer route, it is totally like an interpretive image, does it lose its integrity as well or is it just a different type of image for a different purpose, that is what I'm, I guess what I trying to do and this is a good example this is an image that I took at the Natural History Museum in New York and I really liked it and I took it because it was symmetrical but it really influenced this piece here, this is why I picked it and it is the vertible artery, and it sounds really stupid and it is kind of only a basic translation but all these things influence the work so in some ways it is like once you lay the origins of the image open, you kind of lay yourself open to criticism but equally you give the image more work, more weight because you realise all that effort and all that craftsmanship has gone into the, I think there is a kind of perception that the stuff I do, particularly to ?? staff is that it just suddenly happens and why has the art school got anything to do with it, do you know what I mean, it is not, the project has never really been about that because if you are dealing with patient communication we are not dealing with, we are detailing with story telling which is about visual language it is not about even about the illness in some ways, although it is a bit and we are tied to the data but we are sort of moving it back and forward constantly

RA You are trying to take it out of context

J The sort of last thing I was going to draw on the blackboard and it is more to get your opinion on this as obviously you come from the clinical side of things and I like drawing with chalk so I'll give you a red bit of chalk and I get the big bit chalk and you get the little bit

RA Mine has to be ???

J But basically you have got this line I think but this could be wrong, so it is not bible by the way it is just something that is evolving but basically you have got the scientific data and the thing you describe and its reproducibility, there is clarity and you are not changing it, you are affecting the radiologists decision and so you are looking for a truth, a true truth, a total truth but obviously your images are never complete truths because they are not exactly how the kidney looks they are a modality based on the quality of equipment so they are sort of, they sort of function in here, the MR and sort of things and right just before reality but they are reproducible and they are close enough and reproducible enough to make a decision, that science is happy with and then you have got the other end you have got this kind of art space stuff and you have got abstracted images that I create, so maybe my vertible artery thing and several vessels sort of sit here they are not quite abstract they can recognise some stuff but they are quite far away from the MR and then you have got like the kidney data which probably sits about here and then we have got some of the flow stuff that sits about here and obviously we have been showing these to the patients because they have got a degree of integrity that is close enough to this that it can tell the story but it has enough of this to actually make it accessible and then you have got all this stuff in between so you have got this kind of spectrum of integrity or band width of integrity or this line and images sort of sit somewhere along that line depending on the degree of interpretation but the other way of seeing it is that you have got like two circles and you have got two centre points and one is like an absolute, again the scientific and one is in arts and obviously in the arts we are interested in telling an emotional story we are interested in probing the depths of things that maybe they are not tangible and that is why abstract art and a lot of the images don't make sense but they are trying to explore things that they can't describe so you have got that and I would say my work doesn't quite fit into any of that it sort of fits round here and there is some stuff that actually sits in here, and then you obviously have the scientific end which is complete truth, there is a complete, the MR is not quite

there it is not 100% reality, it is a sort of flow, sort of lumen or how protons vibrate but you have got images that sit in the middle and then that is what you show patients, and do you think these diagrams truly describe what we are trying to do here?

RA *Em*

J *You see that is what I'm trying to tease out*

RA *You see I think, first of all you are looking at science but anyone that does radiology has to be doing because they like images, for any radiologist or anyone that wants to sit and look at images all day there has to be an aspect of the fact, they don't just want to look at data they want to look at images and I think is has helped to talk about where all this has come from, if it is truth here and art but basically half of those text books, all the radiologists, they are looking at the truth but they have to at the very beginning they spend hours and hours and hours looking at images*

J *So you think it is not just about data*

RA *Not al all, and I think for us, funny MRI are things they are a little bit ahead of other modalities but basically most of these are making do with a lot of this processing and getting something that looks a bit more, I mean we don't particularly look at that kind of data we know we want to do the next stage and get something that looks, not the image so much, but we want to look at the mix and view it like that so I think if that is all just raw data I think you are trying to push something towards here and that is things that we look at, if we get a beautiful image I think you are looking at something more complete because when I look at ultrasound for example, it makes no sense to me it is just like dots and even if someone when we studies it back at college this is exactly what is does it is the science behind it and it doesn't look like a nice picture and they have never ever given me any pleasure whereas when you look at MRI images and especially the processed one that we have*

J *So how would you define beauty then, when you say a beautiful image what would you define as something like that*

RA *Work related or*

J *Well sort of both or start with work related stuff how would you describe beauty to you*

RA *I don't think, okay work related I don't think*

J *Is t about clarity and clearness*

RA *Yeh and how I can relate it to probably something I've seen in a text book, if I can produce an image, I've not got any up to date research stuff at work, the things that get people most excited are if you have like seen any of our small bowel things it is because they look more tangible and more real compared to just looking at an x-ray of the bowel but I don't think particularly it evokes any emotion whereas if it is for art work it will be like that for a reason because it reminds you of something or it makes you think of somewhere I don't think work particularly does that*

J *But it is interesting, it is sort of like something that looks real in a sense that is has clarity as well*

RA *Yeh because if I look ultrasound images or even now CT now tat I've done CT and moved on to MRI I look at CT and thing ooh, I mean some of it is, the post process*

looks good at work anyway in my case if I can create something that looks more like what is inside the text book I suppose. I think MRI is kind of striving towards more artistic.

J *You are trying to move something that is more reality and it is not so embedded in the numbers but not too far down this line that it can't be used and have this reproducibility so that is sort of a barrier to it*

RA *And probably always will be*

J *So there is plenty stuff*

RA *You feel I've drawn enough*

J *Well you draw the line, well you can draw if you want*

RA *Did you say this was your flow stuff*

J *No the flow stuff that we showed to patients so it was closer to, although you could argue*

RA *If it was that is what you have shown them*

J *The thing that I haven't put on this though which is probably important because we haven't mentioned like understanding and emotion like obviously the closer to truth you get how much emotion is that going to cause if you can't navigate and see what it is, and emotive image, if you show a really kind of raw MR fairly abstract and tell someone that is cancer obviously they are going to be emotional but how much emotion is going to be really induced so it doesn't fit what you think is bad and so it is like this kind of carafe where you have got emotion and so you get more emotional as the image probably gets closer to reality I don't know or do you get more emotional content as the image get*

RA *I think the trouble is that you will never be able to look at images, how are you ever going to be able to measure purely the image because what you would almost have to do is sit a patient down in a room with a piece of paper and an image and know the person because you can show a person the worst, not the worst but from their point of view medical images that make no sense but if they have got a doctor sitting with them they will believe it more and it is more like a thunderbolt but if you sat down in your jeans and your T shirt with something that looks far more obvious to them, this is what they have got, it is difficult*

J *It is all about context and there is a lot of complexity to this and I think*

RA *Because patients would automatically trust even if they don't understand the images as much maybe it would be easier to comprehend it more because it is telling them and that doctor has to know what he is talking about but I don't know how you can ever just test an image on its own, it is difficult*

J *It is virtually impossible as it is so subjective and it is so difficult, in some ways I am barking up the wrong tree with diagrams because these are based on measurements but what I'm trying to work out is how e can take on this dialogue and discussion with patients and you and I and put it in a kind of more condensed format to try and explain as obviously doing all these interview and I'm trying to sort of work out but I think it is so complex all we are doing is re-mapping we are not actually trying to, these are all kind*

of semi conclusions you really cannot include any of this stuff based on information that we have gathered it is too messy, these sort of things are just too messy they are

RA *I think every patient as well if you said to one patient this is the condition that you have got it could be totally different to another patient and how they actually take the news or even you can educate patients they are so, I think we definitely need something*

J *I mean there is two things in my work which is like, one is to try and inform patients and that is one aspect and the other aspect is to get people to engage more with scientific imagery or to get people to realise how amazing the body it and I think that is a separate thing where you have got this really beautiful images but they are not made useful just to the patient I'm actually trying to broaden people's kind of interaction with their bodies that you can image quite deep into the body and the MR images are often quite ugly, not ugly but no accessible and if you made them quite beautiful and quite engaging then people realise that this is a beautiful landscape this is amazing, it is this kind of awe inspiring space that we have inside of us that somehow hasn't rally moved much from the scientific community, you don't turn on the TV and go wow that is a brilliant programme about my body, you often see a lot of blood*

RA *But you do use it, if you ever, I don't know if you ever say it but I remember*

J *Well of course you have got documentaries and you have got stuff*

RA *But I think when they ever first started showing the foetal images and things inside and everyone was amazed by those because they have never seen them before. But do you think that would actually, do you think it will change how people view themselves?*

J *I don't know it is going to be a difficult one to again measure, I think we are very much an image based society now and*

RA *But inherently do you not think ?? and that is why all these advertising companies often use shock tactics it is like rape, it is like after the event this is what has happened*

J *Yeh there is not much prevention going on, there is also a lot of out of sight, I don't know it is almost like creating these images it feels quite futile and you are just hoping that people appreciate them but I think I'm probably taking on too many things also and no one person can produce what I produce but if you make a difference to people I think even in small way even just two people appreciate the work then it is worth it, it is worth and to make and facilitating I think what we have discovered with the work that we have done with patients the images have allowed a facilitation process they have allowed patients to understand a bit more about their body and appreciate the space and then to ask questions which they would never had the confidence to ask before it is almost like*

RA *Because they understand the images*

J *Yeh they have a better understanding and they have an image that is quite engaging or a series of images with flow and what not and then they are like, it is almost like they have had a little bit of education and a little bit awe packaged up in a small ?? and now they can go to the doctor and feel a bit more confident about asking his a question or they can feel a bit more empowered about doing something about what it is this kind of small step, it is not maybe a radical one but it is a small step but there is almost like two aspects of the research and it is almost a kind of link between, so like we have got the patient here and the image is sort of sit in the middle right, and the patient has accessed them and then you have got the clinicians but that is only one side of the story as I've explained the images have also got a sort of aesthetic input so it is all the*

aesthetic aspects that are being used to produce the influences of the images in the styles and the language, all this sort of softer kind of more humanities based stuff, it is not, you know my PhD is actually 2 PhDs it is two areas it is like this and this and it is up the road and it sort lives in this sort of small slithering between two, do you know what I mean because I'm constantly having to

RA Yeh bring that back into all the time

J And obviously the images cannot function without these two inputs without you Trudy and Graeme and Steve, if I take you away then all I'm left with is this kind of style and form with very little function but if I take that away then I've got a lot of function and a lot of story telling but I have got very little form to hang on, so it is form and function together and it is a bit like the brain because design this happens a lot it is nothing new this concept as in design you have got a car that looks amazing

RA But it is not practical

J But it is not practical so you have got a chair that looks great but you can't sit on it, the designers have to play that off

RA So do then you feel compromised a lot of the time

J No not at all because I always think there should be a use for what I'm doing and I don't want to make things that re completely no one can sit on the for instance I don't want to make an image that is so beautiful and abstract but it gives very little insight into the human body it is just a pretty image I'd rather have something that sort of functions between these two sort of, I hate to call it but this sort of science or clinical it is not just

RA That is true

J I think in some ways I'm focusing a lot on how people interpret the image and then ??? this a lot of it is do with this, all these interactions and this process of building work, well you can't separate it from this sort of line and I've asked you a lot of questions about interpretation a lot of it is to do with this and these links between, it would be good for one of you guys, it would be really good for like an imager, someone like a radiographer or radiologist to do an inverse to come and study sculpture because surgeons already they are kind of, surgeons know that a good surgeon is often someone who is probably very good at art, it is not, they did some tests a few years ago now up in clinical

RA Because they have got humanity then as well

J Yes and also they have got an aesthetic sensibility in often sort of surgery and things they look good usually are good, if you make a good job and fix patients and sew them up properly

RA Last year, as I know that there is always surgeons that the scenario of a 15 year old girl comes in in a horrific accident then that surgeon because you know that she will have far better scars than if it was someone, maybe does perfectly good surgery but outside

J Well they did a test on the surgical story when they had registrars and they were trying to pick ones they would take and they had lots of tests like a lot of physical tests like drilling holes into walls and screwing things in and doing general manual dexterity and they have some drawing exercises and I think one was like trying to pick out shapes in a painting and things like that and what they discovered was the ones that had the much more visual sensibilities but maybe weren't as good as getting dexterity were

better surgeons because they can teach them the dexterity you can't teach them the kind of visual interaction, but I don't know whether that is very scientific, it was a lecture I went up to in the Surgical Skills Unit, it was one of these sort of silent type pictures and was trying to sell the whole process of, but I think in imaging it is like it needs, if you are dealing with patients this is really important, if you are dealing with radiologist then it is just about diagnosis and you don't need this interaction but the minute you move the images sort of move interaction into the patient domain you

RA *Even then all this, there must be a degree of that goes into all our software because every time it is upgraded you can do more and more and at the end of the day a lot of the time it is the post processed images, they are not raw data the radiologists will always go back to the raw data to write reports and things as even in our stuff you will lose a little of something every time you do it but it is this that gives me confidence what I'm looking at all the time.*

J *Well I've talked a lot and I'm too tired to say any more really*

RA *Hungry*

J *Totally knackered now, I'm not hungry*

2.6. Anatomist A

Interview with Anatomist A
Date: 18/10/06
Time: 09.30
Duration: 2:00:49

J So just to explain the layout of the bit of information, on this screen here, this is very much the science imagery this is the, when I say science I mean the image that comes of the scanners

AA So basic medical interpretation?

J Exactly so it is the MRI data and I think one piece of CT data and the rest is MRI and it will be images that probably you have seen before, on this screen this is the visualisations, this is the visualisation that have varying degrees of interpretation and some have been used with patients and some haven't and I'll give you some indications of what I've done and why I've done it and then maybe we can talk a little bit, but feel to pitch in, add in and ask questions because there is no right and wrong answer so we will start with this one here and I'm going to put two images up at the same time so we have got an ability to compare pieces of information, visual information and obviously if you want more clarity on them then please ask but I'm sure I don't need to provide you with that, I've got that down on the sheet if you require an anatomy clarification and I'm asking a professor of anatomy if they require any anatomical

AA What is really worrying for me though was that you were going to show me something and what the heck is that and I'm just going to let you down, my anatomy is going to let you down (laughs)

J So in the image straight ahead here this is image one and this is an MRI scan, it is an MRI scan which was taken here in Dundee at Ninewells hospital and it is a sequence of cross sectional slices so this isn't taken across time this is one moment in time and the slices are going from front to back and it kind of shows the head and neck and the areas highlighted in white are the high signal areas of the arteries that supply blood and on the left we have the same piece of data that has been visualised in three dimensions but it has also had texture and digital lighting added and what has also been added is alternative camera views and those have bee put together in a sequence that looks and it only last for about ten or fifteen seconds and it loops over and over again and what I will do is just leave these up on screen for s few seconds to let you just take in the image and then I'm going to ask you four questions. So the first two questions are linked so I'll ask them in sequence and then we maybe talk through them so the first question is please describe in your words these images and what insight they offer into the human body and the second question which I think is linked to that and we can jump to these two questions, how would you describe the visual qualities of these images and feel free to make and add things to

AA This is always, the MRI image is always very very difficult to interpret always but and I would say it has taken me years and years of training to allow me to figure out exactly what each of the hot areas and where they are at any one time, if I was in my teaching mode to medical students I wouldn't even consider putting that in front of them it is far too complex, they would not get this at all, if I was working at the professional clinical anatomy level then equally it is a difficult interpretation but I would be happier to use

that, however, when you see the image that is and I don't know if you want to call it reconstructed image or whatever it may be that's had so much of the peripheral information stripped out and leaves you with the central information pertaining to what is actually going on in the MRI image, now it is still very complicated and it has to remain complicated because it is an incredibly tortuous structure and its tortuocity is what is important about that arterial system, so it doesn't over simplify it, it still gives a very clear indication of the complexity but it is stripping away everything that is ancillary and it allows you to visualise what is really going on, now I think it would take a professional person to be able to relate what you see there on your reconstructed material to what is going on in the MRI image, I think the MRI images for anything other than professional level viewing with a patient that has no value at all, in terms of a teaching value, in terms of an explanation value I wouldn't use that so to my mind that MRI is a clinical diagnostic tool, it is certainly not something that you would use at any level for teaching or passing on information whereas the reconstructed image is much more useful and because you are being able to see this in more than one dimension it allows you to look, because where you have got the MRI what you have is a superimposition of the two systems of the common corroted system and the vertible artery system and you have really got look hard to separate out where those two systems are but because on the reconstructed image you can move around it you quite clearly see where they are separated you can seen where the common corroters are and you can see where the internal corroters and you can see where the vertibles are and that three dimensional representation doesn't exist in the MRI.

J *The third questions is this issue that we have discussed briefly on the chair Sue and it is do you feel the interpreted image or the three dimensional image that I have because it does have a degree of interpretation it may be tethered to the MRI scan in respect that I've extracted the vessels but everything else I've added is purely fictitious, the lighting, colour and so forth, do you think that has less integrity due to the degree of interpretation or more or is it difficult to make any comparison or is it linked to context which was suggested earlier?*

AA *I think the interpretation that you have given to these vessels is phenomenal so that I appreciate that the lighting is interpreted is yours the colour is yours and I have to say that the colour is not something that would bother me in the least I wouldn't care whether it was black and white, I think if you are teaching somebody whether it is student or a patient then yes it is important that a blood vessel has a sort of red coloration but I tell you what it doesn't have it doesn't have an aggressive red and plus that is not an important things for students I think it is an important thing for patients but an aggressive red is actually quite scary and especially when you talk about something like blood vessels, so I think in terms of interpretation of colour that is very cleverly done because it is not a coloration that causes you immediate anxiety but it is still very clearly a blood vessels because it has got the red tinges to it. I suppose if I was being a perfectionist on it I would have liked to have seen the vessels in a smooth form rather than, you can see there are planes that occur on there but there are natural planes that occur on those blood vessels anyway where they pass underneath ligaments and particularly where you can see those vertible arteries as they come round in the angle there they pass underneath a ligament on top of the first ?? vertebrate and I suspect in that position they are flattened just like you can see on the one on the left monitor so I think there is a realism that is there but perhaps you didn't anticipate or expect to be there but I suppose I would have liked to have seen them looking more rounded blood vessels, lighting is not an issues because I think the lighting allows you to really gain the full three dimensional aspect of it and in terms of anatomical integrity then other than the various sort of small tags that you can see just hanging on the end, I'm not whether those are going to be little vessels that are coming off, those are things that perhaps if I was teaching I might just have snipped off because it leaves this query of what are they*

and where do they go to but with these kind of things you have got to ask who is it that you are presenting this to, if I was teaching vascular surgeons then I would want every single one of those tags to be a clear indication of where it is going to but if I was using to teach a medical student, a first year medical student or using it to impart information to a patient then I would probably simplify even further, don't lose the tortuosity of the vessels but perhaps just losing some of the minor side vessels but you have to

J I love that word tortuosity

AA It is also the fact that what you have of blood vessels, here is another one for you is an arberescent approach and I think the arberessence that comes with this kind of thing can be confusing to somebody at a lower level of anatomical understanding whether that is Joe Public, first year medical students or whatever, so I think it could have more detail depending on the nature of the client if you like or less detail, so at the moment I think this is pitched right in the middle where could see that a patient with no understanding might be a little confused by the blind endings but by the same token an arterial expert would be able to know, well I know actually where goes off to so I think this kind of fits in the middle.

J I suppose this is a question you have already answered Sue, so if you feel you have we don't need to do any further with it, but as a clinician and a scientist do you think the artist has enhanced or diluted the original 2D data?

AA Unquestionably it has, absolutely unquestionably it makes some sense out of, the logic that you are trying to extract out of here is exactly what you have done in this image and I'm trying to do it mentally as I see that but it is nowhere near as effective as actually being presented with that image, now the trouble is that these kind of images are very powerful because when they are presented they are accepted then as being correct and that is I suppose part of the worry is that if there is over interpretation, under interpretation you end up with perhaps and I'm not suggesting this isn't the case but beautiful artistic images that might be anatomically incorrect, from what I know of the MRI images and the blood system that we are looking at, that doesn't look like it is the case at all, but if there was no control over the interpretation I would worry that these kind of images could find themselves being used because they appear to be so useful but if there was incorrect information in there they would be very very powerful negative tools.

J Absolutely, that is really interesting, it is funny just continuing on from that this issue of misinformation and people taking the images as often and absolute truth and I presented that to one of the physicists yesterday and MR physicist and what he said was that image is not an actual truth either that the MRI which could have a certain degree of artefact

AA Agreed

J and I'm not, it is not a defence I'm not defending it, it is an interesting thing that I never thought of as I concede this to be that is the way this is but all it is in the proton density of a material which isn't necessarily reflective of the anatomy

AA Yes it is an image

J proton density measured by chemical compounds in the tissue, so if it picks up that tissue incorrectly, but that is up to the radiologist to cancel out that imperfection in his own professional practice or the physicist to say well that is actually an artefact

AA *But the other things is that this is presumably your data has been derived from this one so that is one individual, human variation is so incredible, it is huge so whilst you produce a beautiful image of one person it may not bare a great of resemblance to the next person which is why the moderation of your images really do I think have to looked at by whether it is the clinician the anatomist or whatever because we do have a considerable number of years of experience in the variation that says, for all you know the imagery you may have produced may have been a 1% variant, it just happens to be that was the patient that was MRI'd that day and that is the kind of thing that we could pick up on*

J *That is interesting. I'm going to slow things down in the sense I'm going to stop the images moving and show some stills which present a slightly different way of looking at the same piece of data, they are actually the same scan which has been enhanced and reconstructed but I've added a certain degree of visual language an almost poetic language to the image for a different reason and I just wanted to see what your thoughts are of this, so this is a still Sue from that sequence and I just want to keep this up for reference so we have got this constantly to sort of compare to. I'm going to show you four images, I'm going to put them up on screen for a few seconds then put the next one up and they are all kind of similar and then I'm going to stop on one which I think is probably a good one to discuss. So I'll stop it on this one Sue and I guess my questions are going to form the same structure so sorry if you feel I'm repeating myself here but the first question is please describe in your own words this image compared to the MR image and what insight it has into the human body and how would you describe its visual qualities, and obviously you can start from your own professional perspective then move into anything else you feel.*

AA *Well at this point I know where the blood is that we are seeing at different levels but what, I mean in the MRI image the blood that we are looking at at the top levels is where it is just coming round the bend of the vertible arteries so it has just come up through the feremina transverse area in the cervical because you can just see the tail of that, it has come up over the top of C1, it has bent back on itself and it is going to head up then through the fermium magnum to head into the skull, what the images suggests to you there is that you have a little crochet hook and it is not what happens at all because the image doesn't allow you to see, the MRI image doesn't allow you to see that as the vessels come up through the feremina transverse area they then bend over the top of C1 before coming back and going up through so you miss the entire loop of the vertible artery in relation to C1 so I know where I am but trying to relate, if I put myself in the teacher position and I've got medical students in front of me trying to get them to understand that that crochet hook image that you are seeing there is in fact an image that is vertical, horizontal and then vertical again it is almost impossible for them to understand because where you have got the constriction and where you have got the bend is the point at which the arteries, the vessels have passed out of that particular plane if you like and you lose the concept of how that blood vessel moves so when you are looking at things like vertible insufficiency and you talk about the ponticle on C1 and how if this ligamentosifies then what you get is vertible insufficiency and you patient keeps collapsing and passing out, it is difficult for the students to understand how that could happening, looking at an MRI image, when you look at the image of these what you see very clearly is the vertical bit which is out of focus then that real loop as it is sitting across the top of C1 before it completes the loop and heads in together to go through the vertible frame before it is going to join to form the vascular artery so in terms of teaching that is, I mean it is and I don't want to use the term head and shoulders above because that would be inappropriate but it gives the student the full understanding of that very brief period when that vertible artery is almost horizontal across the top of the bone and you can explain to them that if the ponticle, that ligament was actually to ossify then what you are producing is a little bony bridge that would*

block off the blood vessel and that can only be done on your image it can't be done on that image, so that in terms of interpreting what is going on this might be what you see, it is what you see in the clinic as the clinician but to be able to explain that you have to do it with your own hands if you like to the student and it doesn't have the same impact as to being able to actually seeing it so this is incredibly powerful, it very much reflect what is going on here but it shows in real perspective rather than in imagined perspective which is what you have with the MRI, did that answer your question?

J Absolutely

AA Because I do go off at tangents

J I suppose another question Sue that continues on which is obviously you can see the uses for this and how it can be applied in your profession and this is probably a difficult questions because it is something you see everyday so you become almost immune to this sort of structures of the human body or maybe not but does it give you insight into the kind of harmonies and structures that the human body offers that you might not necessarily see in other things because I've brought them and focused the attention into the symmetrical form

AA Well it is not symmetrical, you see that is what I find interesting and I know that the human body isn't symmetrical and the reconstruction you have done there is not symmetrical, it is largely following the same pattern but the right side of the body doesn't follow an identical to the left side and you can see that you have got ?? one and they are displaced on one side and I know that is what they do but knowing it is what they do and being able to see it is something entirely different so yes it does throw up symmetry but it also throws up the lack of symmetry if you get my drift, there is a basic symmetry but it is not an identical symmetry, so what I would have liked is the vertible arteries to have fused at the top of there so that they have a same basular artery rather than two separate arteries heading off the top.

J It is funny because this can was done on someone who was perfectly healthy and wasn't of someone who was sick so we were looking for something and didn't find it and I find that the scans that I often deal with deal with people who they are looking for a disease process or areas there could be issues there are vessels that are not as well defined so you don't get nice pictures which is quite interesting

AA But you see what that makes me think of is we always teach that the two vertible arteries fuse together to form one basular artery, maybe they don't always maybe

J Do you mean, is this the bit at the top right and if just goes up and sits

AA Yeh what you have got you have it coming round, you have got it coming together and you have got two vessels parallel with each other, normally what we talk about is that those two fuse together and forms one vessel the basular artery but maybe it doesn't so looking at the image has made me thing, I wonder if that variation does occur, I don't know.

J I found some reference material on the internet well it was kind of pathology of a dead person, something that had been taken from a surgical procedure and it did replicate that

AA Did it!

J But you had a rubber glove holding the vessel like that so the camera man could take a

photo so you don't know whether obviously they had to cut it open and take all the other stuff out of the way to get at it to see so again I don't know about this. I'm going to show you another image sue here which think might stimulate a bit more discussion now this is a diagnostic volume reconstruction of the same piece of data, so this is something a radiologist would use to try and link this to the 3D, I don't know how you feel about this one and its visual qualities and its integrity?

AA *There is more information there certainly than the previous one it does take you quite some time to get your eye in to where it actually is, I suppose what worries me about this is that although there is a lot of information there are gaps in the information whereas what you have tried to do here is take a system and keep the system intact so there are gaps in the information so for example you can't follow that vessel all the way from its origin to where it is barbricating you have got a perception of where it is because you just see it, you can just catch a glimpse of it but you are not getting the same sort of definition now it depends whether that is important or not, I just don't think you could use something like that to teach a medical student straight at, you just couldn't, they have got to have an understanding of the basic form before they can apply it to something like this.*

J *It is almost like in some ways it is really useful to have human interpretation in this sort of context but plug it through a machine and let the machine make the decisions on where things are then reconstruct but obviously baring in mind that you mustn't doctor or change the data to significantly that it detract from what is actually there*

AA *Yeh but you have got to look at what your eye, your client is, your client basis if it is going to the general public to help them understand why there is a balloon being put into a particular artery for example then you don't need the huge amount of data but if you are using it to train a vascular surgeon then you do, you need a tremendous amount of detailed information, this doesn't fit, this image here this rotating image doesn't fit either of those because there is not quite enough detail but yet there is too much and I really think that is quite a disturbing image for someone like a patient to see, I mean I wouldn't have a problem with a medical student seeing it or a dental student but I would have problems with a member of the public seeing that*

J *It is faceless as well*

AA *it is a bit Hammer House, Hammer Horror type, approaching a face cut off type of thing.*

J *There is a bit*

AA *It is a very nice piece of information I have to say but*

J *It is a reconstruction software that comes on the scanner that they use*

AA *Oh right, I don't like it I have to say.*

J *Okay we're going to go onto another, we are working our way further down the body start with the head and now we are going down to the kidney, further down the vascular system, you have seen this image before I'm sure this is the kidney 3D reconstruction*

AA *Yeh seen that one*

J *So I'll just give you a brief intro as I have done with the other ones but I'm sure you know what you are looking at but this is an MRI scan taken again at Dundee in Ninewells and it is a cross section of slices again from renal angeography and this scan*

was performed in the diagnosis of a vascular condition called renal artery stenosis, a serious condition that occurs on the vessel feeding the kidney and blocked by arterial plaque which may result in a surgical intervention by a clinician and I can actually show you the, you can probably see it

AA *I think I've seen yeh*

J *So obviously for the purpose of this and this is the overalls can that this was pulled from and this is the 3D construction of the kidney on the left, the healthy kidney while the kidney is having to work harder because the other one is not functioning due to the lack of blood so this is a 3D reconstruction and again it has been digitally lit and transparency has also been added to give a reflective texture so the first question Sue is please describe in your own words what insight these images provide to the human body and the visual qualities of these images?*

AA *I suppose the fact is from the MRI it is very clear where the stenosis has occurring so in terms of a diagnostic tool then again that is an absolutely classic appearance and certainly if you were teaching at any level then I think that is understandable so I think you can say there is the major blood vessel there is the kidneys there is the spleen those are heading down through the illiates and you can see gut and that is all understandable and I think it is also understandable at the patient level because it doesn't have the same extent of three dimensional interpretation for example the vertible artery scenario had so it is much more linear in terms of you have a vertible big blood vessel that vebricates off at a particular level going to these two structures and there is the stenosis so I think that is perfectly understandable and very good quality for explaining what is happening in that condition at any level. As an anatomist I really don't like that image and I don't like it because it doesn't look, I think artistically it is very pretty, it reminds me of a jelly fish instantly looking at it it doesn't make me think of a kidney because when I think of kidney I don't expect to be able to see inside it, now I know you have put transparencies on it and different lighting but to me that just doesn't look like a kidney, now I know it is because I can see the outer cortex and I can see that what you have produced inside of the culeces and you can see the major vessels that are coming out of the hymen but I can't get past the concept that it is a jelly fish, if you get my drift (laughs) and I suppose the other thing about it is that for me anatomically it is not in the right position so that I expect that kidney to be rotated so that you have got the hymen passing if you like medially and so the poles are in entirely the wrong position so it needs to have a more vertical orientation and I can see why you would want to put some transparency on it but I don't know that by doing that you have actually helped to understand the or to portray the internal architecture of that, I think it is very pretty, I wouldn't use that for teaching, I would be much happier to use this image for teaching both at first year medical level and at professional clinician*

J *And in terms of when you say it is very pretty what aspects of it are making you think that in terms of this*

AA *I think the lighting and the colour are very attractive, I suppose if I was being pedantic yes I suppose there is a redness to it that I expect are arterial vessels there is a part of me says where is the Venus vessels and shouldn't they be a different colour and I think the lighting and I think the transparency is very, it is very pretty it is very striking but anatomically it doesn't do it for me at all.*

J *I think the reason for the Venus vessels are not shown is because the angeography is not shown up*

AA *Okay that is fair enough.*

J *That is interesting though I never thought of that, and again it is this sort of interpretation processes is restricted to the, because it is linked to the scan and this angeography which is showing only the pressurised vessels going away from it rather than the ones coming back you don't get the, so you lose one half of their vascular system*

AA *Yeh that is true but what you are doing is you are interpreting this image for arterial purposes, if they were interpreting it for Venus purposes then you do another procedure and you would end up with a different image, I suppose the realism of the vertible artery is the integrity I suppose of the realism is much stronger because this is not a realistic interpretation of the kidney, you would never see this in a kidney so it is real interpretation*

J *So would you say that this has less integrity then?*

AA *Yes*

J *And it has probably not enhanced the data?*

AA *I don't think so no.*

J *Okay well you are going to love the next image*

AA *(laughs) I told you I would be honest*

J *No this is great.*

AA

I really liked the first one

J *So this is the same piece of data of the same kidney but it has again been reinterpreted with digital lighting and it has got much more liberal illumination to it and it has obviously been completely differently textured and no transparency and I suppose the question is what insight does this offer into the human body and what are the visual qualities that you say this image has?*

AA *Anatomically I prefer it because it is more of a representation of what you would see, there is a unrealistic aspect to in terms of the area that connects the blood vessels so whilst, I can't think that there would be anything other than there might be some adipose tissue to connect it but you see what I mean where you have got the vessel coming out you have got a large swathe of connective tissue before it bifrocates into the two areas, what it make me think of when you look at the end of the blood vessel it makes me think of bone, it makes me think of the end of a rib, so that the whole blood vessel there actually to me looks like a rib so that the conversion into a different medium has given it a solidity and I don't have a problem with the solidity of the kidney, the organ itself but I do have a problem I suspect with the solidity of the blood vessel because it looks as if it is hard and brittle, so it has more anatomical integrity to me than the transparency did but I still have some issues with it and I still for teaching would use the MRI image.*

J *Okay and do you feel that it has less integrity or more integrity or none?*

AA *Than*

J *the MRI data*

AA It has less but it is not

J But it has got more than the previous?

AA It has got more than the transparency yeh.

J We are going to look at the third piece of data an anuerism just to cheer us up

AA (laughs) Nothing like a good anuerism before ??

J It is an abdominal aortic anuerism, this is a piece of CT data, these menus look great but they are not good to navigate, so the image straight ahead of you is Sue is a CT scan, so it is not an MRI scan it is a CT scan and was actually done by Scott I think, it is not of Scott though

AA I'll tell him that, I won't give him my answers

J And this is the main artery feed well you know where the aorta is and these are diagnostic images and they were used to detect a condition called abdominal aortic anuerism and obviously you know what it is Sue, the image on the left here is the same piece of data that has been reconstructed and it has some basic interpretative colours and some basic camera views, I've got a few versions of it but they are all the same data but it has been very much an interpretation part from the addition of colour so first question is please describe in your own word what insight they offer into the human body and its visual qualities?

AA The CT image is very clear, it is very good and you can see exactly with a trained eye, I think, where the anuerism is but they are of the mind of a clinician , I love what it shows me in terms of the skeletal system I have to say but that has got absolutely nothing to do with the anuerism however, in terms of explaining it, I mean a moving image like this isn't really useful for explaining the anuerism you need a still shot of the level at which occurs and that is what the reconstruction shows me so the moving image isn't helping me answer in terms of giving and insight into the anuerism whereas the interpretation of it I can see the value of that not only for explaining it and for teaching it but if there is a realism to it in terms of size and dimension being able to manage it and being able to predict from it what would be the best approach to sorting it em I have to say that the quality of the image is superb in the CT, it really is but for its purpose it is much more limited whereas I suppose the trouble is with so much information on the reconstruction which is skeletal but you do need that and I think that the skeletal information would be very useful for the student and the clinician and I wonder if it would confuse the patient but it does show exactly what the problem is and it shows exactly where it is and so in terms of both diagnostic and teaching then the reconstructed image is in many ways far superior, again I would quite like it and I know this is just aesthetic but I would really have liked to have seen it smooth surface rather than sort of roughened surface and that may not be, that maybe my ignorance in terms of what an anuerism actually looks like maybe the external surface of the blood vessel is pitted I don't know I have no idea but I just expect it to be an expanding balloon and we talk about it being a balloon and then when you expand the surface you actually expect it to become very smooth, like a balloon

J Well it probably is smooth on the outside but because this is illumine that is the lumen that is the flow inside the vessel

AA Ah okay, I thought I was looking at the outside of the vessel.

J No that is the inside so it is

AA Oh understand okay

J And to be honest if you look at this scan here and this is probably going off track but I got this from one of the physicists yesterday which is you see here the bright parts as it goes down the aorta and it goes down there and then it sort of bulges and you have got these white spots on the outside that is probably either a calcification

AA Sclerosis of some sort, okay that makes perfect sense

J Or what is the word I'm looking for?

AA ??

J No another, it should be something else, what is it when you get all the clotting and stuff, thrombus, it could be thrombis as well

AA No that makes perfect sense

J So that is probably what gives you the, there is three versions of this so this is why you get all this kind of breakdown

AA No that makes perfect sense absolutely

J The reason there is pitting on the bone on the skeletal stuff is probably down to the fact that there is artefacts on the scan because of the tenuation of the x-rays and what I would normally do is I just smooth all that off myself by hand and just go onto the 3D data as I've got it and just tidy it all up knowing that I'm not getting rid of anything but this goes back to this issue of do I smooth something off that could actually be part of the bone and it is sort of having this inside knowledge and there is this constant struggle between interpretation in telling the story and not detracting from an integrity of the scientific data. It is almost like a sliding scale but when you are dealing with patients you sometimes are just keen to give them the essence of what is happening rather than actually and I doesn't really matter that it is not absolutely perfect what you are trying to do is get them to buy into it, there is a bulge at the bottom of your aorta, I mean that bulge is probably and you would probably have to ask Graeme Houston but I would suspect that the bulge is even bigger because that is in the inside so it is probably even more

AA It is huge when you see it on here, absolutely huge.

J I don't know what the prognosis for that would be it would be pretty catastrophic really wouldn't it

AA Once it goes, I mean if that was go then you have got to be on an operating table to be saved when it goes because the instant loss of blood and pressure, I mean you are unconscious within seconds and you are dead within minutes but what they can do is sort of reinforce the walls, so once you have found the anuerism you can deal with it, it is when you don't find it is the problem and then once it goes there is no coming back, my great uncle did it very spectacularly when he was having Sunday lunch with my parents he was sitting eating his soup and he just went clunk and it was just as if he fell asleep and landed in his soup, bless his heart and it was an anuerism and aortic anuerism that just blew and my mother said it was the most peaceful thing she has ever seen in her life because literally he had just lost conscious and that was it.

J *Because all the pressure is just gone, it is just like taking the valve out*

AA *Yeh you just pass out and there is no pain involved because there is no nerve fibres, no pain fibres associated with the blood vessels so you just go unconscious*

J *Or you end up on Peter Stonebridge's table, if they can get you to Ninewells in three minutes.*

AA *Well that is it, chances are zero.*

J *It has been rally interesting though to hear you describe all these things Sue that it is almost like the narrative is really powerful, I mean anatomy seems fairly inert when you see it in imagery but the actual human story to it is actually very powerful and it is almost like you could somehow match this sort of, I mean it is much more powerful that some sort of laughable Hollywood drama it is almost like the real life is more interesting than some of these and it is almost like bringing humanity to what is fairly inert anatomy which just exists which is just a collection of tissue and atoms that exist within our bodies.*

AA *It is just a collective amount of information and I think it is part of the problem that medical schools go through it when they down grade anatomy and say that you can learn it from books and we can learn it from the computers when you take away that personal element and you take away that ability to narrate and explain anatomy is dead but it is dead, it only comes to life when you talk it and when you talk it is a huge subject and it is a rally vibrant subject and it is the one thing that the medical students when they go through anatomy they always remember their anatomy education and they always remember the anatomist because anatomists are by nature story tellers and they have to be and I think students lose a lot from their training if they don't get that sort of human element of telling the stories.*

J *It is an area though that anatomy in terms of, there has been quite a few studies in the literature about giving patients an anatomical understanding because obviously you give them a complex disease process presentation, this is what is happening and we are going to put a stent in and we are going to ?? here and this is the aorta I mean what is the aorta, what is the heart what does it do, they have got all the mystical understandings of it it is the centre of your body but they don't have the science/system*

AA *It is a pump think about it like the central heating system in your house, that you have got a boiler and you have got a pump and you have got hot water going out one end and you have got cold water*

J *Story telling.*

AA *It is story telling and it putting it into a concept that is understandable and clinicians with the best will in the world, so many of them so focused on their particular area that they have lost the concept that the patients just don't understand the basics, I mean my father was in hospital very recently he fell out of the attic onto his back, completely disrupted his ?? joint and his pubic synthesis now he didn't understand what he had done he just knew he had hurt himself so I talked to him about it, image your pelvis is like a polo, like a mint if you break that polo it has got to go in two places if can't just break in one so that when you disrupted one joint the other one has gone so you have got two bits of the polo and they are not meeting each other in the mid line and he could understand that but it was not something that his clinician ever put to him and I think if patients can understand the concept of what has gone wrong they can then deal much*

easier with the concept of what is going to happen to them to try and sort it and anatomy doesn't it isn't presented to the patients either present it to the patient in a way of a school room, which is the heart is a pump and it does da de da which is bland, boring and doesn't help but if you can put it into a story I think that is the key to patient understanding.

J *Yeh you are absolutely right and I think that is what has drawn me to this area and I think there is some synergy between what artists do and in specific terms of what I do rather than some hippie or dippy painter there is this concept of a story teller that works with whatever media they may work in to then translate and mediate, I think that is quite an important issue this mediation process, I mean someone like you Sue you naturally have the ability to tell stories and deal with all this but go and spend a day with all the radiologists apart from Graeme at Ninewells you will fall asleep*

AA *Absolutely*

J *You will fall asleep but they are front line they are the people and then they go to these multidisciplinary meetings and then they are often the ones that feedback to the patient or it might be another conduit it maybe the vascular surgeon that feeds it back and there seems to be no strategy there is no*

AA *But you have think when you have produced these beautiful images that are telling your part of the story how much value is that adding if the clinician don't give the other part of the story so that you are going them another tool but somehow someone has got to teach them how to use that tool in the most basic of senses and there aren't many can do that, there really aren't.*

J *It is interesting we have just done a study on 20 patients which is not very many but hour long interviews basically taking them through renal artery stenosis and using some of these images building in a sort of narrative based film but it is a DVD so it has a degree on inter-activity into it and just sitting them down and explaining to them where the kidneys are and what the kidneys do and then explaining what the disease process they are being scanned for, it very low level and we had this kind of notion that it would provide them with the information that they need and they would go away happy and that has always been the idea of bringing technology to explain what the this stuff is like and say this kind of and spoon feed then and go away happy but it didn't, what we felt and we are still sort of processing them as it is quite a lot an hour long interview over 20 patients but what we are starting to pick up it what is has done it has had an effect where they say okay I kind of get that but and then start asking more questions that they wouldn't have asked before 'I didn't quite the bit about the kidney being there, what does the kidney do again' so it almost acts as a catalyst rather than the silver bullet that is going to cure and save the consultant time what it does it ties up more of his time, or ties up the health professionals time to increase interaction and give the patient confidence to then ask something and to then feel that they are buying into the process and it is not the guy in the white, it might be down to the demographic we are dealing with I mean the average age of these patients with these renal artery stenosis is something like 55 so they are not that young and they probably feel I don't want to ask the doctor too many question type stuff so it maybe down to that, if you took a younger patient they may have already asked the questions and don't need the 3-D, but it is really interesting they are asking can the tape be stopped can I take the stops can I take something home to show someone so they are almost like*

AA *You are not giving them quite enough, so it is that whole thing do you tell them nothing and just let them have blind faith in what the clinician is doing or do you have to actually give them so much more than you had anticipated which kind of clogs up the system*

J *I don't know I think what my idea would be that you bring in, you don't use the consultant for this stuff you use like a health professional*

AA *I agree*

J *You use like a health professional like an allied health professional to come and sit and go through it with you and you have these consultation, patient information consultations times where patients can drop in a surgery they can gain the information and go away and come back and if there are questions that can't be answered the allied professional will go away and if he can't answer it well we provide it and it is an ongoing dialogue that happens because you will never give them enough information it could always be too little or too less but what you are doing is you are starting a dialogue and you are getting patients to buy in and start feeling that the health system isn't just about nuts and bolts, it is not just about, I mean I went to the Dow Lecture and the guy came up and he said there was too many tree huggers in medical schools he said oh it was great that we can teach medical students how to deal with bereavement but if they don't know what is wrong with the patient what is the point which I can see why he is saying that but how there has to be balance struck so I'm not saying that what I do, but this study is starting to bring out some interesting points and I'm not going to cover them all in a PhD I'm just going to say this is whats happened and this has been said and postdoctoral work would suggest that you could*

AA *You see the other way that I think your images could be more powerful is that if you allied them to something that the patient will understand, you have to assume a lower common level of knowledge in a patient and the trouble is in doing that you are going to offend some patients but if you can think, for example when we were talking to a patient about a vasectomy for instance we will say can you remember the old teleports that had the sort of square base and had a telephone receiver that went down and the curly wire that came out well the telephone is your testes and the hand set is epidillums that sits on and this wire that comes out is the one that we have to snip and they think oh I can understand that because if you snip that you are not going to get the phone call or communications and it is about in some ways relating the true realism of the image so something that perhaps the patient can understand whether it is a central heating system whether it is you know putting a sieve for example underneath a running tap which would be what the kidney does for argument sake it filters, allying your image to an image that they can readily understand*

J *Give it context*

AA *Give it context yeh that would go some way towards interacting with the story telling part to the patient.*

J *It is almost like you need them both working in parallel you need a sort of analogy or metaphor to try and explain what is happening but then you do need sort of an enhanced image just to give them a feel for what we are talking about, this issue*

AA *Realism absolutely*

J *It is almost a bit like the ultrasound images of the foetus or the unborn child it is so powerful even though you can't make out what is there it doesn't really matter if you get that it is just wow that is part of me and humans need that sort of buy in don't they but they also need the bit about this is where it goes*

AA *The basic understanding, sorry I'm talking too much*

J No this is what this is for it is almost like with the patients it is a, you show these images and you kind of ask fairly dry questions but then often other things spin out from it that you didn't expect and I think that is the point of today really it is a dialogue, This is the last set of images Sue

AA This one I know because you were working on this when I think when we first met.

J Oh really, okay well these are actually quite old now they are not, but obviously because they have movement in them I think. I'm going to start with this because the way these differ from the other ones is, I'll explain what this is first of all, this is a cross sectional slice taken from a scan and MRI scan done at Perth Royal Infirmary and it is a cross sectional slice it is a cross sectional slice taken over time rather than just one moment in time but interesting enough this is cheat it is a real time look at how the heart pumps but the physicists have explained to me that the scanner cannot take the scan slices fast enough to keep up with the heart so what it does it takes one phase of the heart one second and then it will take another and so then it pieces them all together so you end up with what you think is a real time heart pumping but it is not it is across 10 seconds

AA Yeh about 6 heart beats or something, its very convincing

J It does doesn't it and when you see the little valve flapping about in the wind it looks like a piece of plastic or something or a piece of fabric

AA It does doesn't it it is fantastic, I love this

J It just looks so fragile I think. On the left here we have got a, this is a slightly bizarre set of images but what it consists of is the aorta which is taken from actually the kidney scan that we saw it is that aorta and then I've added these red blood cells which are over sized obviously not to scale and what I've done is I don't have any real reference for the heart pumping so I've used the visual reference of that heart pumping to inform the movement of these blood cells moving through the body so it is almost a bit like a magpie approach you have just taken bits from lots of pieces of data just to tell the story, you have taken visual information from a heart pulse, I've taken some data from a scan and I've added blood cells to try and explain that this tube is not inert it has a particulate substance moving through it that blood has it is made up of lots of different things so and in this case it was just to try and show how blood flow works this kind of pulsing image so I think the first question is please describe in your own words Sue what insight these images offer into the human body and the visual qualities of each one?

AA Well I have to say that this MRI is just gold standard isn't it, I mean that to me is just the absolute epitome of clinical images because I can see me using that at almost any level of teaching to show blood flow in a heart, to show the beating and what it also does and shows which most animations of the heart don't get is the fact that isn't just a simple beat when the heart beats it also twists and it is like wringing out a dish cloth because that is how it empties the valves and that shows it perfectly so I can use that for teaching I think it is a wonderfully clear demonstration it shows everything that I would largely need to use to teach that competently to almost any level of medical students so to me that is a superb image. I think this is very pretty it reminds me a bit of Disney and Pixar and it is very stylised and it is quite mesmerising I like this part where you can see the corpuscles going through but of course what it doesn't show for me is show how the walls of the blood vessel react to that pulsing and the fact that all I've got in there it would appear are red blood cells, I would quite like to see it dotted around with a few

white blood cells and platelets and other sort of things that make it a little bit messier so it is a little bit too clean for me, it is a little bit too stylised, it is very pretty and I'm not quite sure how I would see myself using that to anybody is the honest truth, I like it very much but probably more as a piece of art than anything else I would also be worried about the realism of the force and the direction of the blood cells that are going on, just how, I don't know when the blood pumps what kind of trajectory that produces in the blood cells but I suspect it is a circulatory motion and that isn't portrayed there particularly, I can see the drag input and the drag, the trouble is the drag is actually bringing it further back I suspect when you have shown it actually does, so it is very pretty, it is unrealistic to me this to me is an anatomical illustration but it allows you to see the shape of the blood cells which you can't see in here there is no doubting that but we know that is what they look like, to me if I was going to use one of these it is unquestionably the image

J So you feel that one has more integrity

AA Yes but it would be very difficult, but the trouble is here you are looking at two different things whereas before we were looking at almost the same thing, you are looking at very different things here and I mean I know, because when I look at this what I'm looking at is the heart pumping what I'm looking at here is the effect of the heart pumping on a peripheral vessel so they are very different things and not directly compreble is the trouble, but I like it, it is pretty and I think it is really clever and I'd love it as a screen saver but I'm just not sure how I would use that.

J That is the kind of responses to trying to create Sue it is getting how people react to these two images together and they are intentionally not the same piece of data

AA I mean the integrity is unquestionably here rather than in here, sorry I'm using my hand and that is not helping.

J You need to physicists who have been working on some really nice heart stuff at Ninewells because they have got a brand new scanner with lots of interesting stuff there. I want to show the last couple of images here Sue this is the last and we will grab a seat. So the image in front of you aorta it is an MRI image and this is a still from the flow sequence and I'm going to sort of show you this and another one linked to this but maybe if you could give me your thoughts on this and what insight both these images offer and what visual qualities they have?

AA I suppose the MRI is not terribly impressive is it, it is instantly identifiable for me I know what I'm looking at I'm looking at the descending aorta, I suspect I'm looking at two renal arteries that are coming off there in the sort of middle part, it shows me the tortuosity from left to right, back to left and back to right again it shows me where the biofication is, yeh it is a fairly standard view but it isn't terribly informative I have to say, yeh would I put that image up in a dissecting room to teach probably not. This reminds me of 'space the final frontier' Star Trek in that to me yes I know they are blood cells but it has got something, it has got a sort of ethereal quality about it that just isn't to my mind realistic so the lighting of it makes me think you are looking at the sun the objects floating around look to me like they are in space and we have got planets aligning every so nicely so that to me has a limited amount of anatomical relevance whereas this has more but it is not a great image.

J Okay so you think in terms of their integrities this one

AA This has more integrity yes than this does but I think it is a very pretty image.

J *This is another image of the vascular data the one with the kidneys that we saw earlier and it highlights the stenosis, how would you describe the visual qualities of this one Sue? And what insight it offers?*

AA *You see in terms of realism of the size of the blood cells to the vessel the scale is not right, it terms of seeing the stenosis I don't think that is the best view to see it from you can see it but I think if you were an uninitiated patient then you would want that view just to moved round a little bit so you can see it on edge that is exactly where that stenosis is occurring so the view itself is probably not the best one to show it. The translucency interest to me does work because you do get this perception that you are looking inside something and somehow to me that is more acceptable than the jelly fish of the kidney, em I like it is the thing, I do like it, I don't think it is quite showing as much as it could do in terms of realism and in terms of the best positioning to show the stenosis*

J *And in terms of its integrity?*

AA *Yeh well I'm moving more towards your image now than to this, I mean I know this is exactly what it looks like but this is such a boring image and what is it doing in terms of the stenosis, it is telling me nothing, of that particular point it is telling me nothing where that is telling me there is a stenosis.*

J *A question actually and this isn't related but I've found a lot of scans that have come off that have like this tortuosity of the aorta but it is directly, obviously the lumber vessels go into the spine and often this kind of tortuous shape is reflected of the way the spine is, is the spine that is moving the aorta into that position or is it the aorta that is just going that way and the spine it just sort crumpled because they are an old person*

AA *Both, when you look at young person where the vertible column is allegedly in, because it is kind of cavities are the anterior posterior of the vertical column but as you get older they shift and you start to get lateral fishtail changes as well but when you look at a young person where all you have got is a normal AP curvatures the aorta comes out of the heart if goes over to the left and you can see it, it really comes down the edge of T4 and T5 vertebrate and flatten the vertebrate because that is where they come and then it comes across the front of it to come down slightly to the right hand side so there is an inherent tortuosity in the upper part in the younger individual but as you get older then so with shifts of gravity that are generally as a result of vertebral impairment whether it is disc collapse or whether it is osteofied or arthritis then you tend to get more of a ?? curve to it with age but the upper part is always there so the upper part of the S is always there it is just the lower part gets more exaggerated as time goes on.*

J *And in terms of Sue the inside of the aorta there is a ??? give me a straight answer about what the way it looks, some people say it is like lasagne some say well it depends on how much calcification has gone on, it could be, I mean what is there a scale of like it starts off kind of red with the red cell coating and*

AA *I don't know, I generally don't know about the inside of it, I mean we look at the outside of it we don't look at the inside of it and the only time I look at the inside of a ?? is when if you squeeze it between the finger and thumb you can feel the calcifications in it you can feel the little plaques and if you squeeze them you can hear them cracking and we will open them up so the students can see where these plaques of calcifications are*

J *That is horrible*

AA *It is really horrid and it is grotesque but it is very very useful to be able to allow them,*

because they think it is just going to be one big long rubber tube and it isn't it get really quite hard and quite dense in places once these calcifications parts develop

J *Will that depend on the sort of function if this affect, if a healthy and fit person that is always lead a really healthy life has not smoked or whatever and has not genetically disposed to cardiovascular disease will that be less calcification*

AA *Yeh very much so, but most of the people that we have in our dissecting room are in their 70s and 80s they are from Dundee the chances are they probably smoked they had fish and chip suppers most of their life and the walls are sometimes absolutely rigid which is really quite awful*

J *Do these people donate their bodies*

AA *Yes it is all donations*

J *Are they some people who died years ago or months ago or*

AA *No what happens is that these are people who when they are alive bequeath their body to anatomy for research and educational purposes and we get about 40 a year which is just from the Dundee area and Edinburgh collects, Aberdeen collects, Glasgow collects and St Andrews collects they don't take as many as we do we take more than anybody else because we have still got full body dissection for everybody which most medical schools don't have and whilst they are alive they fill out our bequest form and a copy of it gets lodged with their solicitor and we keep a copy and when they go into hospital or a care home or whatever we ask that they let people know that this was their wish and we get notified sometimes that he has been admitted and we expect him to go within the next 24 hours or they will also lodge a copy with their GP so that when the GP goes to the records they go oh there is a bequest form here and the notify us now most families know about it and agree that this is what they are prepared to do because it was the wishes of the deceased person but some families just don't accept it and under those circumstances we won't take the body because we won't cause the grief to the families but so they come to us within hours of death because we have to embalm them before the blood vessels start to collapse because we are using these vessels as the means to get the embalming fluid all the way round and to every tissue and if we leave it too long then they will collapse and the embalming process won't work at all, so technically you could come in, it doesn't happen but you could come in on a Monday and be on the dissectory by the Friday it doesn't happen that way because normally we store the bodies for an academic year and if you want to come up and see that, just give me a shout*

J *Definitely*

AA *And I'll show you round the facilities that we have got there*

J *That would be really great*

AA *No problem and normally what will happen is that we will store them up for the next academic year and then in May of every year we have a memorial service for everybody who has been in the dissecting room that year and all the families are invited and all the students go as well and it is a real sort of service of thanksgiving for the donation that these people have made of their remains.*

J *That is really nice*

AA It is an fantastic service, it is not at all depressing and the families get a tremendous amount of support and uplift from it and it is hard for them because it may have been two years since dad died because we can keep the body for three years and it can be a long time and it means that wound is opened up again for them but we get so many students they line the path up to the chaplaincy and the line the inside of the walls and when you speak to the families afterwards they say gosh they did all that for my dad and they do get a tremendous feeling of my father helped to train this doctor and we have a wonderful eulogy that was written by one of our medical students which is read out every year which talks about the cadaverous as a silent teachers and the kids do get attached to them so when the finish one or two of them will say can I just go in and say cheerio and thanks kind of things and some people out with the department might think that is a bit odd and morbid but they look at them as being their teachers and they learn more from those cadavers than they can learn from an clinician anywhere

J So do they dissect it across a year then Sue a sort of ongoing process and not just one experience they come back to it and take it out of the fridge

AA They do it a whole year, so that they come in and say for arguments sake a Tuesday afternoon and Thursday afternoon and will dissect the next bit and then the following Tuesday will dissect the next bit and Thursday do the next bit and so they remain with that body for an entirety and when you talk to any medical student who has been through whole body dissection one thing they always remember is anatomy and they remember their cadaver and for them it is often for these kids the first time that they are ever exposed to death and to having a body and the hardest things for them is when you expose the face and you can start cutting through the face they do find that hard but then they get over it and it is a real desensitising process in some ways and they have to work as a team and so there is a good team spirit develops in the dissecting room, I think it is a phenomenal experience, I know I'm digressing.

J Shall we go and get a seat Sue that is this part over and you have been really helpful

AA Did you get what you wanted?

J Yeh I mean basically

AA No right or wrong answers

J There is not and it is almost like a process of mapping really it is mapping peoples responses and how people are reacting to different things and what issues are coming out, you are dealing with complex issues I think here and it is difficult to sort of ring fence anything it is just constantly shifting and changing and interpretation is very difficult to pin down, I mean psychologists are far as the last four hundred years to research to try and tying that down is it not what I'm trying to do with this I'm trying to sort of tease out the issues of disease and imaging and what exactly an artist should do, I face a constant struggle with my colleagues in the art college because they are from a different, well we are all from the same camp but there is different mind sets and one mind set it why should artists serve science should we not develop our own interpretations of the work but I think a lot of it is to do with context and ethics and delivery and I think in one context you deliver work it is not appropriate to completely interpret something but in an art gallery space it would be appropriate and it will depend on the brief that you are working to at that time and I think also I think there is a lot ethical consideration when you are working with insensitive areas like this and you can't get away from that

AA But there is no doubting that art and science and within science I include medicine there

is a real symbiotic relationship there and there is a reluctance almost from both sides to meet in the middle ground and Caroline Wilkinson in our department

J *I know I've met Caroline*

AA *Well she is putting on a MSc in forensic and medical art which is unfortunately become know at the FART degree but it is forensic and medical art and I think that really very clearly shows the common ground between the two but trying to get the two sides together it is really hard and I don't understand why there is this resistance.*

J *The thing is this conflict is not new in fact did you come to the anatomy exhibition in Edinburgh the one in the City Arts Centre?*

AA *Thats coming up here*

J *Yeh*

AA *Yeh*

J *It been to the Lamb Gallery in St Andrews, I went round that and I read the catalogue and I've actually go the catalogue there but we were talking about this role of the artist but historically looking back on how artists have worked with patrons per say as I'm trying to build up a historical part to one chapter of my PhD I think to contextualise this media I'm working in and where I sort of come from but artists have always had scientific patrons De Vinci, Michaelangelo worked for the, they worked for the church they worked as apprentices for the church and they were facing these questions and conflicts because they had to sell the church it was a public understanding of the church it was a propaganda tool that they were serving but they still managed to produce some of the biggest contributions to contemporary art they were the forefathers so you get these kind of 'we are artists and we have to be the Tracy Emmen group and I think there is a place for that but I think the conflict is not new is what I'm trying to say and to say it is new is naïve and to work for a patron and in this case to work with scientists who often in my case have been real benefactors to what I'm doing because they can see isn't selling your soul it is actually getting unbelievably interesting material to work with and surely if art is not about that then what is it about.*

AA *But art isn't a definable thing it has a huge span and there has to be room for each end of it*

J *Its a spectrum isn't it*

AA *Absolutely with shades of grey in-between and I think there is a difficulty if you are sitting at one end of the spectrum being prepared to accept something that is happening out with your own field but it is really only at another extreme of the same spectrum*

J *Absolutely and you need that scale for the thing to function you can't have everybody at one end you have to have*

AA *Well we would end up pickled sheep and that would be it wouldn't it.*

J *Sue I'm going to ask you three questions at the end here but I want to show you some stuff, it is more about the origins of the work, I mean basically you are probably aware that what I do isn't just a kind of translation process I mean obviously there is lots of inputs to what I do, some of them are more obvious than others one is reference books the old trusted anatomy stuff to really guide me and get a feel that I'm talking the*

language of discourse so that I can communicate you need to be able to know what to ask for but you also need to know where things are but that is just not the only input to what I do the other inputs are obviously the exploration, space and it is a visual language there is a composition to it and that does feed into the work and it creates a feeling of awe in people when they are looking and think wow is this really blood and guts can be represented in a way that has the same feeling as an Apollo landing it is a kind of language of discourse that feeds into that but also there is a historical as well, looking back to the way the body has been reflected and also the sophistication of the historical medical anatomy illustrations as it were it was quite complex and also very politicised and I think that kind of diversity of work is something that a contemporary artist working in this field has to consider and that does feed into what I do but also less obvious things like I really kind of used the lighting techniques that Vermeer used as a traditional kind of painter and how would that influence what I do in using computer graphics but the computer doesn't give you default light centre it doesn't tell you how to light things you have to tell it what lens you want to put on the camera you have to tell it how you want to light it and you have to build on the things that a painter or a visualiser would do and you have to have reference like Vermeer had Caravaggio as a references I use lots of different inputs and you can see the progression you can see this stuff is quite influenced by these sort of pieces so it is not just, I'm sure I'm preaching to the converted here but it is just to give you an insight and this is a quite good one actually this is an aortic anuerism

AA ??, but you see the thing is that that has a much more aggressive quality this is a less threatening colour which I know that is maybe silly think to say but if you are a patient that is much more scary a pink than that is. The information you are getting is the same thing it is an expanded blood vessel that is being dealt with but the fact that it is red and red to us is always warning it is danger this is much more red than this is, to me this is a much more sensitive colour

J It is more of an illustrative colour it is more in the domain of this, it is almost like you are using almost using pencil to try and make it so non realistic it tells a story but it is not realistic it is almost like you need to distance yourself from reality sometimes don't you

AA it is very clever, but you see you can understand that in nature where you have things like ?? they are forming that link and this is exactly the same principles that have gone in here which is why I think it is so important

J Pressure in time

AA Yeh it is exactly and why it is so important to be able to say to people lets use something that perhaps you can understand and people have seen that and if you can relate it to something that isn't threatening I think that is half way into us telling a story

J This image here is one of the Mississippi delta and it is just part of the vascular system, that is a blood vessel and it has been ??? This is even better this one

AA But it is doing the same principle it is doing exactly ?? what it is more is Venus pattern than an arterial pattern because it is not coming from here it is draining into here if you like but it exactly, it is arborescent

J A couple of things to show you on here Sue and then I'll ask you those questions, this is again and revolving on this notion of integrity this heart reference I then sculpted a heart completely not from it is not just an sculpture of scientific data and then build the heart but I've just used my own sculpting process digitally to then reconstruct the movement but it is a purely interpretive image in that sense

AA Don't worry about the anatomy

J Well exactly it is almost a style lined anatomy but in doing so you stylise it and sculpt myself so no origins in science in the sense I am a complete translator I decide does it lose integrity does it

AA Not at all I don't think it loses any integrity at all

J This is the ?? I've build that from scratch that is not from an scientific data and this is interesting as well I was in the Natural History Museum in New York and I took this photograph and had it above my computer because I really like the symmetry of it but you can see how it then influenced that piece of work so there is this sort of

AA Yes but it hasn't taken away the integrity not at all

J I'm still working on this and I really need you help with this at some point

AA No problem any time at all

J It is an area the heart is incredibly difficult, because it is moving

AA The whole three dimensions because it doesn't just do that as it does that and at the same time it does that so it is like wringing out a dish cloth

J I mean I can get the actual movement it is really getting them ??? to break up and do that

AA But you have to say it is depending on the client base do you need that

J probably not

AA Probably not and even ??? you didn't need that

J I mean what I'm trying to do with this is, when people say talk about the aorta and the intervention it is on the vascular disease but there is no heart involved you don't see the heart so how could it be vascular disease so I thought we need to give context to what we are showing patients

AA It is very funny we were having this discussion in the anatomy department yesterday because the way our anatomical sciences today is set up you do gross anatomy dissection in one as a model and it get tested you can do gross anatomy two as a module and it gets tested but each module has to stand on its own which means that in the gross anatomy two then perhaps we are looking at the lower limbs I can't ask them the question that says follow the blood vessel from the heart to where ever because the heart in a person there is only one and we fell that the students are losing the integrity of being able to use all the information

J They are not holistically looking

AA Exactly and we are not allowed to do it because of university regulations as these modules have to stand alone and you can't request information if students choose to give you the information on another module that is different but you can request them to give you this information.

J That is mad isn't it

AA It is absolutely mad and so if you want to look at the human body as a system we can't do it for examination purposes we can look at it topographically as we can move on from the thorax ??? and the minute we try to make it a system whether it is the heart anatomy or the nervous we can't do it. But looking at it from the educational perspective of the student that if you actually make it one big component it would be 60 student points and if they were to fail it how the heck are we going to make that 60 points back

J So an administration model

AA Yeh and I don't think it sits like that.

J Lets grab a seat Sue and three more questions and we are done and we might use the blackboard because I like blackboards

AA Me too

J Because it is good for diagrams and I think a lot of this stuff and we were talking about visual concepts and it is good to try and plot out some of these issues and the first question is do these images affect the way you think about your body?

AA Well yes they have to, I mean what it does for me at different levels I can look at it and say yep this is a true representation of what I think it looks like anyway or it can make me look at it with the vertible vessels and say I wonder if we do get a situation where instead of one basular artery it is actually two vertible arteries that run in parallel and you don't have a connecting bridge so it makes me think my instant reaction to looking at one of your images is, is it realistic so I find myself ticking off the anatomy to decide whether it is on not and then at another level it makes me think about others things that perhaps I hadn't thought about before, so it does

J That would be a really interesting post doc project for me to take to move by work stay post PhD to revisit the work again and then to start developing a vetting criteria just to check its integrity to see and to bring in professionals in a multidisciplinary approach to develop really kind of different types of integrity in different systems in the body based on the radiological data that I'm working with and see how it checks out with the real anatomy as obviously there must be this discrepancies and that sort of bit in the middle that would be quite interesting as I think that is something I haven't yet really, I mean I have just been throwing all these things into the air and seeing where they sit and what comes out but now I'm thinking right I need to pick one of those things and develop it and try to find funding to develop it into the next stage

AA If there is anything in anatomy that you think we can help you with it is at your disposal

J That would be really good actually

AA Well it is there, we have the cadavers don't forget

J I know I would love to actually sit in and watch

AA Well do that just give me shout at some point, the best group to sit in with is probably my, I've got two post grads who are doing anatomy dissection as I'm great believer that you need to have multiple strings to your bow if you are going to get into an employment market and whilst these are two girls who are heading down forensic

anthropology and medical art side of things I want them also to be able to say I can teach anatomy, so they are dissecting a body at the same time as the science students are doing it but you could sit in with them any time

J *I'll just watch though*

AA *You might change you mind and you may actually want to help them and if you do that is not a problem*

J *I think it would bring some and I can see it in the hospital as well from time to time you just detach yourself from the humanity of the bits that you are looking at it is like the physicists a lot of the physicists are quite squeamish but they are quite happy to shove a patient inside an MR and cook them for an hour just lose track of the actual physical tissue here I mean the physicists stick shampoo bottles and all sorts of things, Christmas puddings into the scan to see how it will react and I think they still think that the human is*

AA *Just another Christmas pudding. We have a very, anatomy has a very definite approach to our remains there is, we never lose sight of the fact that is it somebodys grandmother, somebodys grandfather somebody who when they were alive chose to do this so there is no irreverence absolutely none tolerated in that room it is decency it is dignity it is decorum we just won't tolerate it and I think it is a tremendous learning process for the students*

J *It is like an ethical things as well isn't it, it is teaching ethics properly it is that ethical thing that you can't you have to be respectful*

AA *And okay they can get a little bit silly sometimes when you are doing a mid surgical section of the pelvis and you have got to cut the penis in half most of the guys don't look and girls are quite happy to do it and there is a natural disserpation of giggles if you like at that time and that is fine but that is their own embarrassment it is not making fun of the cadaver and we kind of let them have that but then the minute they have done it they forget and they are down into looking at where is the prostrate or whatever and they have forgotten the silliness of it and it is quite interesting because we don't tolerate it for long*

J *That is because they have become desensitised almost*

AA *In some ways.*

J *What would you define as the visual integrity in your own practice Sue?*

AA *Oh God save us*

J *In the sort of sense of images and things that you deal with and based on things that we have talked about and you have eluded to it a little bit already*

AA *I guess we use multiple sources is the honest truth because we have got the realism in front of us so the real integrity is there we have got the dead body but you quickly realise when you look at the body on this table and the body on that table that although the basic pattern is the same there is going to be differences so you never, whilst you might accept a basic pattern for things you are constantly aware of variation and it is one of my thinks when they talk in anatomy about, you know we an learn it from computers and we can learn it from books if you do that you only learn on anatomy and you lose the concept that there might be variation so when students are digging around*

and saying ' I can't find this artery' you say yeh exactly and you could be the surgeon that is looking for this artery and it isn't there and you have learned a really important thing so we are aware that the best source for us is the cadaver after that then I suppose we tend to lay most reliance on the old anatomy text books but the trouble with the anatomy text books is that the current authors are standing on the shoulders of giants that have gone before them and when you get down to a specialised area for example what I really know about is the osteology but there are so many mistakes in Grays' anatomy that are just not true because it was in the previous edition and it was in the previous edition and it somehow got into an additional somewhere else and everybody quotes it and it is just not true so that you get to a certain level in a specialism where you know that even some of the best text books don't have complete integrity there are mistakes in there but if you were to write a text book that changed that the changes would just be so minute it is real train spotting stuff so again depending upon who are you teaching so that if I had a medical student I would be quite happy with Grants Atlas I would never used Grants Atlas if I was teaching a class of vascular surgeons so I would go to Croxbrook rather than I would go to anyone else so you pick and choose the medium that you have depending on the client that is in front of you and the level at which you are prepared to prostitute yourself in term

J So there is no absolute truth then really in these text books they are all just somebodys perspective on it they are similar to interpretation really?

AA Absolutely they are someones interpretation so they are generally the artists interpretation that the anatomist is prepared to accept or if the anatomist is the artist which is rare these days and has always been rare is that it is what the anatomists wants to portray that perhaps makes it tidier makes it neater whatever it may be and then that gets handed on generation after generation and if there is a mistake in there or if there is a inconsistency in there it is perpetuated so that much of the anatomy text books that we have now are stylised text with perpetual mistakes that were are prepared to tolerate because they don't make enough of a difference, now the one book that most anatomists won't tolerate is Last because Last has what we call Lastisms in it that he has come up with a number of things that nobody else has ever seen or come up with but maybe he is right but it bucks against the trend so much that you would only give Last to somebody like a clinical demonstrator who can sift through it and decide what they want to believe and what they don't you would never give it to a medical student because if they believed it then you would set them on a wrong track so there is no truth is the honest truth.

J It is just the varying degrees or people interpretation and that is quite interesting because it is almost like it seems to be something that is bubbling through everybody I've spoken to so far that even though there is a perception that there is a lot of, that hard science provides you with the truth but it isn't really it is just shades of grey it is just maybe over to the black and trying to strike us into the black

AA There is a mean okay but around that mean there is a large standard deviation and depending on where you are and you could be on that side of the standard deviation

J Do the 99% tally

AA Exactly and it might be that side of the standard deviation is what is represented in the text book oh and then we are in real trouble or it might be that it is a part of a variation that surgeons need to take account of but a member of the public just doesn't

J What do you make of these things Sue these guys that are working on this human visualisation project and it is not like the human genome it is the human vissal or

something like that where they are trying to, there are about five or six institutions in the world collaboratively trying to cellularly grow models of various organs but mathematically so what they are trying to do is like build vessels through mathematical right down to the cellular level so you know what the cells are going to interact mathematically modelling to a degree of tolerance and then you run this almost like simulation and it grows and so you start building all the complex data of how the systems interact and blocking it together like building blocks like mathematical building blocks?

AA It sounds like a mathematical masturbation quite frankly

J It does doesn't it because how would it reflect the variations and complexities because nothing can fit into mathematical model

AA It is my whole principle is that once you have a model then it is the model that tends to get accepted and you tend to forget the variations unless they are prepared to write in variations to their model and then you infinite in terms of possibilities

J It must be infinite for interactions between

AA Exactly and I'm sure it is a very interesting project and I'm sure it acquired a tremendous amount of research funding to do it she says being a total cynic on this

J It is probably US money I think it is mostly US institutions

AA Probably and I'm sure it is very and I suspect there will be a lot of spin out things that come from it that are useful but I'm not sure how useful the core project is it is what comes out of it that might be useful.

J that wasn't one of my questions I just threw that in as a boomerang. The last question I've got is what role do you feel artists should play when working with medical scan data and some of the key words that have come out from other people have been translator, mediator, illustrator what would you define Sue as the role?

AA I think it is part of the integral story teller and I think that when you are trying to convey information if you just stick with medical information the process of conveying that information is actually done as a team so it is part of a team that you have to be and the clinician is if you like providing the final part of the story and explains where it is going but you have got to get the patient there and the only way to get them there is through the story telling but it is both visual and verbal to get a full understanding of, well to get understanding if you like so I think the role is part of a team but it is an integral part of that team because if you are trying to convey information to a patient through words and I mean I love radio, I love radio more than I love television because it gives you imagination but in terms of medical information you don't want there to be too much imagination because imagination gives you the possibility of error or mistake

J I agree with you

AA So that you do have to control the imagination and the way to control imagination is to put in pictures and I think it is mediation of information but it is part of a team

J Do you think that artists that work in this domain they have got a kind of broader responsibility to sort of communicate to sort of a more public understanding of science and the body to make more of a public awareness that you create images that have a more mass appeal than just an intimate one to one with a patient that the artist may

have more of a sort of Jamie Oliver appeal like a broader kind of chefs cook for everyone that go into the restaurant but then they make cook books and that is maybe not an analogy but

AA *I think there will always be the public who will be slightly squeamish at what you do because there is an inherent the public loves to see inside themselves but they want to do it from behind fingers so they want a protection from the real gore, although they do say they like the gore they don't really and they will hide from it, if you looked at the faces of the people who were present at the Von Hargen's public autopsy there were very few people that were sitting forward in their seat glued the majority were sort of sitting back slightly removed and a lot of them would have their hands in front of their faces which is classic protectivness or arms would be crossed the body language was really interesting that they wanted to be slightly removed it they were fascinated by it but they wanted to be removed from it and I think that is a role that illustration can do for medicine it can give the information but it can protect the patient from part of the gore of it as well so it is a safety net in some regards, there is a huge responsibility if you are going to be a safety net and it is the protection of the patient but it is also making sure that the patient gets the right information.*

J *It is really interesting as well because when you fill in the ethics form for NHS Tayside they don't actually ask to see the images, they will ask you to verbalise everything or write down everything that you do but there is actually no section including the visual material but then they just approve it so how can they approve images that you are showing because they haven't seen them but that seems to be the protocol because they don't build that one size fits all ethics form it is just, it drove me insane I had to get obviously get one to do it with patients*

AA *Oh I've just been through one as well and it is a nightmare of a form absolute nightmare of a from*

J *40 pages*

AA *46 I think it is*

J *Are you taking blood from a patient but then they ask you all the other questions that deal with taking blood so you have got five questions why can't they just say are you going to be dealing with blood, no then jump to page 20*

AA *Exactly and forget everything in between I couldn't agree with you more.*

2.7. Radiographer B

Interview with Radiographer B
Date: 18/10/06
Time: 11:15
Duration: 1:18:31

J One screen is going to be all the physiological data and then on the left is going to be all the data I've constructed from that so some of it you may have seen and some if it you might not. So I'm going to put obviously two images up simultaneously and I'll explain what they are and give you a couple of seconds for just have a look at them and then I've got four questions I'm going to ask you about each one. So this image in front of you as you will probably know is an MRI scan that was taken at Ninewells I think it was last year and it is a cross section of slices of the head and neck and the area that I wanted highlighted is the arteries that supply the brain with oxygen and blood and it is not an animation it is a cross sectional slice over one second in time rather than over a duration of time, on the left is 3D reconstruction of that same piece of data and it has been reconstructed and it has been digitally relit and texture and lighting has been added and it has been edited together in a short sequence but it is all of the same piece of data, I'll just let it roll for a minute. So the first couple of questions Scot are linked, the first question is what insight do these images offer into the human body and how would you describe the visual qualities of each image and feel free to make comparisons between each one.

RB The actual MR image that is if you like is what is actually happening but to a certain extent it is still drawn by scientists like, it is not what is happening it is a representation from the data coming back from the body picked up by a scanner so that is as close to what is actually there as is possible to do. Again this image here is a representation because all that is coming back is signal data so that is all computer generated anyway so what you have done is you have taken the computer generation from here and you have added effects to it if you like which make it far more human looking if you like, that looks terribly scientific and medial and if you are not medical you couldn't possibly understand all that however, that looks ?? and these are blood vessels and they all join and you can actually point to where they join, as far as use of these goes it depends who is looking at them and from my point of view I tend to understand that MRI one anyway but for me dealing with patients I would tend to think that that is far more real from a patient point of view if there was an abnormality that you wanted to show a patient it is all very well telling them about the abnormality and showing it on the MR sequence however from a patients perspective most patients I think would understand the 3D lit image far far more because they can relate it to themselves, this is what is in my body, there is a stenosis there you can point to exactly where it is and related it to what the blood vessels supply so I mean beautiful images and all they are doing is you are further enhancing the already enhanced data that has come the MR scan

J do you think the image on the left the 3D Scot has got less integrity or more integrity than the scientific image or is it not fair to make a comparison

RB Well it is not fair to make a comparison, as soon as you start adding effects to

things you risk losing integrity, the source images are the closest to the signal that is coming out, if you were to take raw data and interpret a different way then perhaps, but the more effects you add and the more smoothing you add and the lighting you add you are likely to lose integrity rather than gain it

J *And do you think that the artist has enhanced of diluted the 2D and if so in what way?*

RB *Visually it is very much enhanced as far as showing to the patients as I said before the enhanced image is ideal for a patient because it looks real, that looks very abstract, the MR sequence looks abstract, it is much harder to relate yourself with that image than it is to the enhanced image, now I wondered off the question, what was the question*

J *What do you think that the image has been enhanced, it is an enhancement of the original 2D data*

RB *Yeh I think it is an enhancement because it is far more visually represented by what is going on inside it from a patients perspective, I think the whole thing is very difficult to say because it is not just, it depends whose perspective you are looking at it from*

J *Yeh if it is through a patients perspective or a radiologist*

RB *From a radiologists perspective that gains nothing really because you know what the arteries are doing, the source data is there and it spots stenosis on them and having said that they will still further enhance these intermit rotational things in order to see, to get a representation of that but one you start adding lighting I'm not sure it would gain anything diagnostically from the enhanced image, however I think there is a benefit to be had when it comes to dealing with patients and it depends on the clinicians as well and what their specialties are and other professionals who will deal with the patient as well, sometimes if they don't have an in depth knowledge of a particular area it is quite nice to see another 3D representation*

J *Okay, that is good Scot, that is kind of exactly what I'm looking for and the second set of images I'm going to show you, I'm going to slow things down a bit and I'm going to bring up some statics, I'm going to show you a series of four images and then I'm going to stop it on one, they are all taken from this one piece of MR data, they are taken from these vertrible artery dataset and they are effectively interpretations of the 3D footage that you just saw, so I'll scroll through them and then I'll stop it one and we will just talk about that one, so the questions are going to form the same structure Scot, so please describe in your own words what insight these images offer into the human body and how would you describe the visual qualities of each one?*

RB *From the perspective of diagnosis the image on the right, you don't have all the information on the static image on the right, what you have is one slice through, what you have on the other side is the accumulation of the entire sequence shown and then you can focus and visualise each individual part separately, the danger of what you have done on the left is it is very much the case of perspective and there is shortening, there is elongating there is focusing on a particular parts of the vessel and in doing so you are losing some of the other data, against that it there is a particular abnormality in this specific part of the vessel you would need able to focus on that particular area, I think it is*

important that you don't forget that just because you have seen one thing in one particular area you assume there is nothing in it and in doing that you need to watch what you are focusing on. As far as an insight goes, why it is you have some soft tissue data there on the MR sequence and you have not soft tissue data on the left other than the vessels to relate to where that is in the body, you are telling me it is in the head but that could be the foot for all they know, whereas that you have got a visualisation of this is the head and you can actually see it is the head, this is the shoulder, here is the main blood vessels coming off so the image on the right has more to relate it to the person, so as you said in the last sequence that looks more real you also have to have some sort of landmark or some basis that the patient can identify with a particular part of the body and on the sequence on the left you would have to use it I feel in conjunction with the MR sequence, if it were for patient use I would say that you should show that, the MR one as the sequence and then you can point out things on that and give a visual representation of it clearly that the patient is more likely to understand on the enhanced image, but I do think you need both don't think you can replace the MR sequence because there is an insight into exactly where it is in the body and what is happening and you can explain how you would manage to get pictures of the vessels ?? waited for the blood to go and there is no signal coming back there is an explanation to be given from the MR sequence that you cannot give on the enhanced image so I think you do have to use both you can't replace one with the other

J What do you think about the visual qualities of that one Scot in terms of the way it looks, does it make you think of anything?

RB Does it make me think of anything in particular?

J Yeh

RB No it makes me think of arteries (laughs)

J Do you think that one is, has the interpreted image got less integrity than the MR image then

RB It has got to have less integrity because you have

J The 3D one?

RB Yeh because you have changed focusing, you have focused on this particular area, you have added lighting and so any data that is on front of that vessel you have bleached out because you have lit the front of the vessel so you have lost integrity on that definitely from the entire MR sequence but again I would caution from just using one MR image because that is actually a sequence.

J So do you think that the data has been diluted then?

RB The data has been diluted yes, however, it depends on what you want to use it for, in some cases you have to dilute the data in order to focus on the important data, has the important data been diluted, not if that is what you are representing, if you wanted to show that particular part of the structure, well in real terms it has been diluted but as far as perception goes, showing to a patient that is very real

J That is good Scot, we are going to move further down the body, I've started at

the head and we are moving to the kidneys, although they are all in the vascular system these are all kind of vascular images really, to be honest, so the MR, the image ahead of you Scot is an MR image produced from a scanner at Ninewells and these again are cross sectional slices of renal angiography and this scan was performed in the diagnosis of a vascular condition called renal artery stenosis, this is a serious condition that occurs in the vessel when the vessels feeding the kidney become blocked or narrowed due to a build up arterial plaque and this may result in surgical intervention. The image on the left is the same piece of data particularly focused on the kidney, but it has been reconstructed and digitally lit with a degree of transparency, please describe in your own words these images and what insight they offer into the human body and maybe describe some of the visual qualities of each of these images?

RB *The images on the right, the MR sequence is a representation of the blood flow through the arterial system and into the kidneys and you are also seeing the effect the blood is having flowing the kidneys, you can spot the vascularidge of the kidneys on the MR sequence however it is rotating through very quickly, if you can stop things then you can point out the, you can spot the blood vessels you can spot the stenosis and in renal life with that sequence you would also be able to rotate it and obtain images although they are not rendered, with sort of 3d surface shading, you can still get information by joining sequences together and enhancing it by micro ?? projection and things like that, so on the right you can spot the kidneys, the spine, the bowel so there is plenty information to be had, in fact all the information you need is on that sequence, the one on the left the rendered image you have sort of volume rendered that and surface shaded it as well so with that presumably you can then cut through and demonstrate the patients in that format as well. The image on the right again from a patients point of view you can see and you can point it out in relation to the liver, the spine, the aorta, the image on the left is a kidney so again what we have gained in detail of the kidney we have lost in the perception of where it is and what is supplying it and where it relates to the rest of the body, I think visually that is beautiful, I mean it shows, it is not just surface shading, surface rendered, so you have got the internal structure of the kidney showing on that image as well however you do still have that in the MR sequence, I do think though it is much easier to relate the kidney function, because you can point to duodenum ulcers in the 3D image for a patient whereas it is much harder to actually give great detail in the MR sequence, I think medically instantly you would go for the MR but if you wanted to explain to a patient then the rendered image is much better for them to get a idea, but again the same as the previous set your would have to use both you can't just, this is a kidney, you would need to relate it so they have some idea what is going on in the rest of the body*

J *do you think that the kidney, the 3D one has got some sort of em, over and above just patients and clinicians, a kind of more general appeal to it for people just to look at as an object?*

RB *Oh aesthetically yes, instantly that is a beautiful image, I mean you can compare it to a jelly fish, that is an art work, so that is where the, you wouldn't call the MR particularly artists however because of the rendering, I mean that looks like a real life kind of serene type of object so yes as a piece of visual work which would I rather look at, that is beautiful, the 3D image is beautiful*

J *And do you feel that that the 3D image has got less integrity or more or can't make a comparison?*

RB It is very hard to make a comparisons with that because

J They have got different types of integrity

RB Yeh, I mean it depends on what you are trying to show, I mean the integrity as far as perception goes, of what is going on inside your kidney, that is excellent as you can point to the internal structures and it looks real, whereas again that looks very abstract for a patient, you have got two white blobs with bits of white, are they going in are they coming out, to integrity wise, medically MR but as far as patients go and aesthetics and just trying to get an idea of what the kidney is, the 3D.

J And do you think that the actual kidney data itself has been enhanced of diluted?

RB Oh the actual kidney data is there on the MR otherwise you could not produce the 3D image, so you may visually enhance it, however all the data is there so everything you can tell on that you can tell on the 3D image, you can tell that

J I'm going to put up another image Scot and just want you to answer the same type of questions, and this is again the same piece of kidney data but it has been reinterpreted and it has been reconstructed with different texture, digital lighting and maybe you could take me through what insight you think if offers into the human body and how would you describe its visual qualities?

RB As far as an insight into the human body goes I think it lacking because it lacks reality because there is no colour, the world is a colourful place and your kidneys are colourful and whilst a medical image you would expect to be in black and white you would not expect a representation of an organ to be white, shades of grey so as far as I am concerned that whilst it is a lovely piece of art work is not representative of a kidney because it hasn't given it colours and enough difference in the different structures to be able to point out this is where this goes in here, this is where that is, I mean the volume rendering of the other one was wonderful because the exterior was transparent whereas with that being a solid structure it is just like a big lump, so as I say whilst that one is lovely it is not, I don't think you would gain a lot with that as a visual representation of a kidney

J And do you think in terms of its integrity and whether it has been enhanced, do you think that one from the original data has been diluted?

RB Oh very much diluted because you have no internal structure whatsoever

J Do you think it has lost integrity in that?

RB Yeh

J So you think it has gained another type of integrity, an art space integrity?

RB Yes, as far as a piece of art work goes it is beautiful, I mean the texture of the surface texture it is very aesthetically pleasing, you would want to pick that up and hold it whereas with the 3D one, with the rendered image you have previously that is lovely to look at and be described, someone describing the kidney could point to all the parts, but if it was made into an object that you

would want to pick up and play with and feel the previous one you wouldn't.

J *Okay, that is really useful Scot, just what I need. We are going to look at an anuerism just to cheer us up and is it probably one you will have seen*

RB *As long you have produced and not one of me (laughs)*

J *I think it is probably a scan that you did, difficult to tell. So I'll maybe just take you through what they are anyway just for the sake of the tape, this is a CT image of the aorta the main blood vessel that feeds blood from the heart, this is a diagnostic image used to detect a condition called abdominal aortic anuerism and the image on the left is the same piece of data from the CT scan but it has been reconstructed using basic interpretive colours and some basic camera views, again Scot please describe in your own words these images and what insight they give to the human body and describe some of their visual qualities?*

RB *The CT sequence again it is shades of grey it is not terribly real looking unless you know what you are looking at, it does however go through and give you soft tissue data, bone data, it is not just focusing on the aorta you do have views of the kidneys you can see, whilst you can see where the renal arteries come off on the 3D image you can actually see them feeding the kidneys on the CT image, you can see the anuerism clearly on the CT image, you can see the other vessels running round in front which you are not actually seeing renal veins running round in front of the aorta on the 3D image. The 3D image as far as looking from what is going on in your body perspective whilst you can explain it clearly on the CT, a patient would understand that as it goes from narrow to wide to narrow and you can point out the fact that it shouldn't while the 3D image is much more real looking because you can visualise exactly what is going on with the blood vessel, again you have to watch with exactly which levels you are using to render that because you can in effect take out and lose integrity from the wall of the vessel if you are focusing on contrast only, you do get occasions where there is ?? plaque in the aorta which will not be rendered successfully on a 3D so what you are seeing is inside the vessel rather than the outside of the vessel wall, however as a simple visual representation to a patient the 3D image is very clear and you also get more of an impression of the curvature of the vessels on the rendered image, whilst you can work it out on the CT and you can see that it is coming forward and it is heading off slightly over to the right and to the left it is far clearer looking at on the 3D one and if you were planning to do an inter vascular repair on that the 3D one is nice to look at because it gives you just an impression of exactly the extent of what you are going to have to do, curvature wise. I know the radiologist that do the, Eva will use the CTs for measurements they will also use the MR sequences to try and measure sizes and it is important that you use the raw data for that and not rendered images because as I say there is a potential error, there is a margin for error depending on what levels are used for your render, as a visual representation the white and red, all you are saying to a patient is, you have got a big bulge in your blood vessel, look, this is where it is and this is what is looks like and this is what it is doing, very easy for a patient and again if you are explaining to someone who is training to do something at an early stage that s quite good just to see as a representation, if it is someone who is going to, if it is a medial student or someone who is going to be doing any other kind of procedures that need further knowledge and that you would have to combine it with the CT and again I think on their own they lose something, if you use the two in conjunction that is where you gain, and the biggest gain for the 3D is if you use it in conjunction with the source*

imagery.

J And in terms of integrity and enhancement what do you think?

RB It has enhanced the visual quality but you do lose integrity with these, you would certainly run a risk of losing a lot of integrity with these as it is depending on the skill of the person creating the images, I mean it depends who, I mean a lot of it is down to the person who is, like your perception if you are producing these images a lot of it comes down to how you perceive it should look, it is the same as when we are measuring things and you think it should be 3.5 you can always measure it to 3.5 just because that is what you want it to do so there is a danger that you kind of lose integrity in that but visual quality it is lovely.

J There are some other images here that are against a black background of the same thing and if there is anything you want to add Scot

RB That is different lighting, I prefer that lighting effect but again that is me, it is very hard to be objective about it it is a very subjective thing and you will find two or three people have sat down and given the choice of different rendering modes will chose, if you give them 20 rendering modes the chances of people coming up with the same three and low, so I prefer that

J The black one there, the last one.

RB Well the other things is that is gives a bit more shape and depth to the bone, things look a bit more real a bit less glitzy if you like, you run the danger of extreme lighting making things look too cartoon if you like

J look plasticy

RB Yeh there is a definite balance to be met.

J Now I'm going to just show the last set of images Scot and these are images that have been animated and they are of the vascular blood flow and I'll just explain what they are, I'm sure you have got a good idea what you are looking at. This is an MR image performed at Perth Royal Infirmary and this is a cross sectional slice of the heart over time and it is a kind of real time reflection of how the pulses flow although it has not bee captured in real time in that sense it has been captured over several phases

RB And super imposed?

J Yeh, the image on the left is a bit of a hybrid of different types of images, the vessel that you can see is taken from the angiography data, it is from the kidney angiography so that is the aorta but the blood vessels have been added by me and they are very much interpretive they are informed by this pulsing motion and that was used as visual reference but they are very much added and obviously red blood cells are not that size so they have been put in just to enhance the narrative and so this image isn't really, it is almost like a magpie, it is sort of a blend of different types of material to create a kind of story about how blood moves through the vessel, so again on similar lines Scot please describe in your own words the images and what insight they offer into the human body and maybe comment a little bit on the integrity of each image?

RB Right the image on the right, the MR sequence again its not captured as you

say in real time so there is a potential loss of integrity because it is giving you an impression of something that is not actually happened because it is looking, that is looking as if it is captured in real time to give an idea of the blood flow through the heart, however that is not real so you have actually potentially lost integrity by doing that, it does however give you a general representation of blood flow through the heart and the lungs, you can see pulsing, if you were showing that to a patient, you have seen the heart working, you can see the muscle wall round the heart very clear to describe structures on the image on the right you can see muscle, bone everything is shown there and it depends on what you are looking for, if you are looking just to see the pumping action you are getting that, you are seeing the heart in the different phases captured over a period of time, so you are seeing how the muscle moves but again you are not actually seeing the blood flow through the vessel. The image on the left is pure cartoon, I'm keen for showing patients how blood moves through however it is all down to your perception as the artist you have put that together and you can have more of these blood cells flying down one leg if you want, you can have more flying down the other leg so that is very very subjective from your point of view, that is your perception of how it looks and you will ask other people, 'do you think this is real' and depending on how many people say 'yeh that looks like it should be right' then you go with that however, is it real? No it is not real at all because that has no integrity other than the walls of the vessel which have been produced in MR the actual flow is purely visual representation, it is very useful if you are trying to demonstrate this, the blood flow and the pulsing and if you wanted to show like the rotation of flow in the vessel it is very useful for showing that where you cannot really get the same perception of that on a MR sequence, they are not the same thing obviously, all they are doing is seeing a representation of blood flow, one is through the heart one is then in the vessel but you can't compare the two like for like, one is, well neither is complete integrity but depending on what you are looking for, if you are looking for functional data the image on the right fine, the image on the left is purely for descriptive purposes.

J And do you think that the one on the left has obviously got a drop in integrity and it is probably diluted or do you think it is enhanced?

RB The actual integrity of it is, well there is none really as that is purely, you have added these blood cells that aren't there, they are flying down vessels, the vessel wall there is an integrity too because it has been produced via the MR sequence but I mean you have not taken blood flow as such data for these images, you have put them in judging

J Based on this reference material

RB Yes, pulse is like that so you take the sequence of pulsing and you added two dots round the screen so as far as integrity goes, you know, however as far a s visual representation of something goes it is excellent.

J Okay, just two more images to show you Scot, this is the last of the images we are doing well here. Now this is two images, this one in front of you is an MRI slice of the aorta and this one on the left is inside the aorta with its blood vessels and maybe you can just comment a little bit about what insight they offer Scot into the human body and the visual qualities that they have?

RB Now the insight depends on the, the image on the right it gives you an insight into the blood flow and into the kidney and you can see if there is a stenosis

and that particular image you can't because you would need to see a sequence of images again what you are tending to do in this is you are showing me something that has been produced by a sequence and comparing it with one image of the sequence so as far as the amount of information goes you have used far far more than that one slice to get that information so to compare the two is not really fair however you can see the main blood vessel, you can point out direction of flow if you want, you also can get a representation of, on different slices in that sequences of the organs themselves and the blood supply to the organs and the organs in relation to each other and if you move the sequence back you can see bone and you can relate things much more clearly generally in the body. Once you are down to how the blood flows through the vessel the image on the right is a lovely representation, I mean the blood cells again, have you taken these from cellular data or have you just drawn them as you see the blood cells?

J Exactly so it is purely interpretation

RB So there is not integrity in that whatsoever really, it is all just made up, it is lovely art work but for descriptive purposes it is very useful, I mean diagnostic it is nothing it is just a lovely image if you were to display it as a work of art it is excellent and it does have a use for descriptive purposes but what do you use it for? If you are going to show a patient you need both again, the whole theme is you can't, that is never going to replace the source data.

J And in terms of integrity obviously this one doesn't really have, how do you feel integrity in terms and enhancement?

RB I mean the enhancement as far as enhancement goes rather than enhancement it is made up completely, you have put blood cells in there that aren't and they are shapes that they may be or may not be so integrity wise as far as this is a representation of what is going on in your body, it is not, yes it is a representation but it is not an accurate one, there is no accuracy involved it is purely a visual feeling of what is going on, the image on the right is data coming back from the scanner which again has been computer enhanced to give us something that we can understand because we couldn't just understand the signal coming back however it is as raw as you can get from it, so yes the enhancement is useful to demonstrate to people but it is not real and as long as you remember that it is not real you can't.

J One last image Scot to put up and it is this one here which is vessels taken again from the MR angiography, obviously cells have been added and it has been relit and it is not taken from this piece of data but it is the aorta with the stenosis, maybe you could just comment a little bit on what insight it offers Scot and its visual qualities?

RB Visually it is again beautiful, as a piece of art I would buy that it is gorgeous, as far as integrity goes it does have the integrity of the wall of the vessel showing the stenosis nice and clearly from the internal aspect, again you are not seeing the wall of the vessel what you are seeing is what your surface shading is sort of contrast going through a vessel, what you are seeing is the inside of it, you are showing us the outside is actually the inside of a vessel, you are seeing the stenosis there because there is something that is narrowing the vessel you are not actually seeing it, that is not the outside of the vessel so what you are displaying is outside is actually the lining rather than the external vessel. As a representation to a patient again that is beautiful it shows the stenosis nice and

clearly, if you want to show them that the blood cells going through are reduced because of the stenosis you can do that because you have added blood cells, you can put pulsation in and you can show that whilst more of the, the other kidney is getting all these blood cells going through, this is getting few because of the flow effect because they are not getting through the stenosis so that is excellent for showing a patient or a school pupil that you are trying to teach or someone who is going to have a slight medical knowledge, excellent. The image on the right as far as a patient is concerned again you have something to relate it to if you like, if you use that to show the stenosis you can also show the stenosis on there you can show the kidney, you can show where it is in relation to the other organs, where it is in relation to your chest, you back so in combination that is the important thing, visually if I were to ask to buy the one on the right as a work of art, you would say 'no forget it' it is a medical image that is all it is and when you perhaps from a perspective of never having seen medical MR images you might think it is terribly impressive and beautiful however it is a medical image, the one on the left is far more artistic, it is far more pleasing to look at.

J And do you think it is has got an integrity?

RB It has a level of integrity in the vessel structure, as far as blood flow through your ?? you are not really, if you say well it is only getting 25% of the blood you would have to have filtration rates ad you would have to add in other test results in order to give an accurate representation so there is an integrity in the vessel structure and you are getting a representation of the stenosis, is it real? No it is not real it is manufactured.

J Great Scot, that is us then for the images, that has been really good, you really covered quite a lot of ground actually.

RB I really think you should be selling these

J I should do actually

RB Seriously people would, it is a work of art.

J I think I'm possibly looking at licensing these images because so many people are using them that actually I should build a licensing deal, so if you want to use them you have to pay a royalty

RB Yeh you should, but I mean the static images there, I mean you could walk into an art gallery and they would stand out, the are gorgeous.

J So we are going to go and have a seat and just chill for a moment. So Scot I just want to ask you three more questions but before we do that I just want to show you little bit about the origins and how I produce the images, just on this table, yeh so just to give you a kind of feel for the images, the images are up it is not just purely a translation process, there is a degree of anatomical reference, obviously like there is like emails and drawings that go between and Graeme and Trudy and whoever else trying to work out what exactly I'm looking at, to build some sort of integrity into the structure that I'm dealing with but there is also quite a lot of other things that go in which includes influences and visual language, I mean stuff like this sort of stuff the sort of sci fi feel to the work, it comes through kind of, it is added, it is not actually there

RB It is your experience

J Exactly and it is my visual style and they way I build it and I want it to look like that so it all adds to the mix and there is historical stuff as well and all these things sort of help me build a lot of these images and even just, there is more indirect influence which is, are you aware of these kind of painting by Vermeer and how would that influence 3D art, how would that influence 3D visualisation of your body and it is lighting and that lighting that digital lighting that I set up has to be rigged and you have to bring it up in a certain way and the influences that

RB You can source the light any where?

J Yeh and that is how it is helping me build a lot of these images, it is helping with the sort of, all these images are built up from very kind of complex interaction but not just about translating and mediating and speaking to you guys and picking up all these materials and developing the images.

RB The danger is the more of that that goes on the less, oh well you can do a bit of that or that you are adding more and more effects

J I'm moving it away from the reality

RB This is real, and you can make it look like anything if you carried it on you can add so many effects that is give no relation to it, it is where to stop, where do you draw the line.

J Well it is funny you should say that as this an example of a purely interpretive image, this is a virtual heart I'm working on and this I like completely been sculpted in digital clay and then I've animated it based on discussions with Graeme and obviously it has a degree of reality but it looks illustrative enough to distance itself from the reality so does adopt a different integrity, integrity obviously I'm using stuff like that to reference the movement and discussions with Graeme and Trudy and yourself and for the purposes of, non diagnosis purposes this is actually probably quite useful and in some ways I can now actually build this anatomy because I have enough knowledge now to be able to build it now without having to take the scan data, because you can't get the scan data from a heart in this level of detail and so adding all this in gives it a kind of, it distances it

RB It is not real heart and you can see it is not a real heart

J But it gives it a sort of integrity in itself because it is far enough away but it is interpretative that if people want to buy into it thinking it is real, it is almost like

RB There is a balance in it, do you want real or do you want cartoon or do you want somewhere in between that is real enough to be real but without being Ooh

J have you heard this thing called the Uncally valley, it is a robotics professor in Japan and Hollywood are obsessed by Uncally valley particularly in animated feature because what you have is like you have got Central Park at one end which is like completely unrealistic but you completely buy into it, it is the suspension of

RB Dis-reality

J Exactly so you know that it is not reality so you buy into the characters and you go further and further up the line and you get to things like Shrek and you get to things like, they are nearly real but we know that they are far enough away from reality that they are not real because again there is this

RB Did they not say they needed Fiona, they actually had to pull back from reality because they could have gone too real and so they had to just pull it back because you had to suspend the real and they had to come back a wee bit to distance it

J Well it goes like that it goes up in a curve and then suddenly as you get very close to reality you get like the Final Fantasy stuff you basically fall into this dip just before live action, it is huge dip and in the sense that is not real I don't buy that, his eyes are not real, his mouth is not real because you are basically

RB All of a sudden you are looking for it too clearly, your expectation changes, from being a wonderful animation it becomes a poor substitute for reality and it has to be

J So it is a kind of ?? sitting on the top here it is like Shrek it is like ?? and then or it has to be live action or if it is not is has to be full, it has to fully

RB Well that is where the ?? and things you find that live action of a generator was it was very fast moving action sequences where you can't, if they slowed it down you would see it was not real however it is done so quickly and there is so much going on they can no aware that it is not live action, but as you say you have to be fooled into thinking it is live action or you just accept it is not real, you can't go as you say you fall into a dip because the expectation of reality is there and

J And I think that probably falls into medical data as well to a sense that you don't want to make it look too real as people think it is reality and in actual fact you are not you are making an interpretive image and it is actually very important that is looks interpretive and not too real because you fool people into thinking they are the kind of reality, like say the gory stuff as well

RB There is a certain sense of ooh I'm not happy with that because people do that actually, when you are involved in it you don't really have that, you tend to lose sight of some people getting a needle and they think ooh so you don't want to have as you say a real heart beating on there because at some point it ?? and if you do that you are not paying attention to the image, something that is real enough that it is a good representation but people as you say will buy into that as a real and can you tell me why it is doing that what is wrong with mine

J It is almost in questions rather than actually

RB You don't need to provide answers, what you need to do is just get something that people can latch onto

J Yeh definitely it is latching onto, that is the sort of image that I took at a Natural History Museum in New York

RB That is actually very good for getting your lighting

J *Yeh but it is also like this other thing is this sort of curve in this has really helped me, you can see the influences*

RB *Oh you can definitely*

J *And this kind of input, all these inputs that I provide to the work changes it but and it maybe pulls it away from its original integrity of scientific integrity but it maybe just adopts a different type, it takes on a different role*

RB *It does and it depends on how you define integrity is it the true data it there integrity that is the exact representation of that, no it is not, however as you say it has a different kind of integrity as a visual representation and that is where the smart image go for it is has a representation for people to understand*

J *Okay Scot will we sit down and we will answer these last couple of questions and the first question I've got is do these images affect the way you think about your body?*

RB *The way I think about my body, no, not really*

J *Because you are probably so used to seeing images*

RB *Well I'm used to seeing them any way so I tend to think of what, had it been early days of training then yes I'm sure it would have done, or if you have no knowledge at all, I mean you say to some people the main blood vessel and they have not concept of what an aorta, it is a tube is it a bulbous thing, your heart is it a pump, oh how does that work then has it got something going round in it, there is no concept so it is very good for basic concepts.*

J *And what would you define as visual integrity in your own practice?*

RB *That is extremely difficult because we are able to re-window things the same as yourself , if we do a CT slice what you tend to get is a default set of values which will show what we want to show you, for example in an abdomen the top of a liver you will see the lungs but they are black because we want you to look at the liver, if we were wanting to look at the lungs we will have it beautiful for the lungs but the liver will just be white and you will not see anything so definition of visual integrity if you like is giving an accurate view of what you are wanting to show and again a lot of it is down to the operator, it is not all down, there is no magic this is what is real for example, a liver lesion if we change the windows it will vanish you will never know it is there, if it is a subtle thing then we will alter the window levels to make it more obvious so you go ooh so it is not at the default values so the integrity is showing as much data as it takes to give you an impression of the real state of the body if you like and depending on your experience you can fly right back and not image them which means the radiologist doesn't see them which means that they are missed completely so it is not just black and white*

J *It is all interpretation isn't it*

RB *Even from, that what I was saying to you the raw data is then being interpolated as images onto a screen it is being interpreted as whatever you want to show it, they are not real, the MR images that you are taking as source images are not real they are interpretations of signal data*

J And then I'm an interpretator

RB You are interpreting the interpretation of the signal data so unless you are actually giving out pure raw data and using that and manipulating it, I mean we are applying algorithms to the data you get so if we apply a different algorithm you get different data so your interpretation of it is based on ours in the first place.

J That is interesting isn't it, I've always, the more I speak to you guys the more I realise that it is just another ?? of interpretation it is just another type, it is just reproducible and that is the important thing you can

RB Yes we can do virtually the same, we will produce very similar images time after time after times after time

J Because you have to, you couldn't have constantly changing or the radiologists wouldn't know

RB And the time you do that is when one size does not fit all for imaging, it fits most but you do get things that may not show up, that is why for example in the pancreas depending on what the clinical situation is we will do different sequences, we will give them water to drink or we will give them barium, so you will get negative contrasts or positive contrast depending on what we are trying to show, it is not just a case of scan the body, a lot of it is well what do you want to see, what is it that you are really looking, what do you think it really is that is wrong with the patient and then you target your imaging to that, for example the aorta the ones that you get of the aorta are early arterial runs, that is now how we would do an abdomen we would do that at 70 seconds once the liver has had a chance to enhance, the kidneys have had a chance to enhance so I mean if you say I want an aorta we have to pick one that we have done as an aorta because that is what we are looking at, we have injected the contrast and we have taken an early set of images rather than a later set so again there is, the protocols are fine but there is not just a protocol for an abdomen even that is, there is not just an ?? of a pancreas

J Its and art form in itself taking pictures, it is a craft in itself

RB There is a certain element of it yeh

J It is almost like you want to, it is almost like science wants to irradiate any sort of, they are always finding ways to keep consistency, keep reproducibility

RB Yes

J So cut down on the margin of error might be brought in by human intervention

RB Yes but you can only go so far with that, unless, even it you say well what are we going to do, we are going to have computer generated images, the computer is going to decide what window levels are best to show this at and what we do is we type in what it is we are looking at and the computer will generate what is thinks is best, who wrote the algorithm, it depends on who wrote the algorithm as to what exactly the computer thinks is the best thing, so it is all up here and in here, what we are saying is science, and MR image is partially science it is a great deal of, well what shade of grey will we make that,

what looks best, so even the science part isn't.

J *What role do you feel an artist should play when working with medical scan data and some of the key words that are coming our are: translator, mediator or illustrator, what do you think the role of an artist would be?*

RB *They are all of them, you have to be all, you have to be able to translate the data but you have to be able to mediate between, again we are calling it reality, it is not, it is an earlier impression of reality with what you would like to show it but so much of it is perception and experience and you can only demonstrate what you know, if you haven't seen, like you have shown all these books, now you are getting so much from lighting form what colour, colour as a kidney what colour is the heart what colour is fat round the heart for example there you are showing fat there as yellow because when you open them up, fat is yellow, but you wouldn't know that so so much of it the artist has to be involved or has to be willing to be involved in finding out basic facts of colours of tissue and functional data, like you say you have done with the heart, you have done enough of them now that you know how a heart should move, actually they don't always move like that so what you are doing is you are giving a representation of what most hearts move similarly to, so you have to be all of them, you can't just say 'well all I'm going to do is translate this data into that' because it depends what you know, if you do not have the experience of having seen so many of them or having spoken to people who know exactly what is really happening you can't do it.*

J *So it is a strong argument as well for being embedded in the whole medical context because you have to be with the professionals, you have to be constantly learning through a process, a bit like a medic and apprenticeship like the registrars go through*

RB *Well I think you gain from that initially because you were in the department, I think that was a big plus point in that you had access to it, any time that you could come through and see could I get a scan of blaaa or you could go tot Graeme and say 'look does this look real'*

J *If you can find him*

RB *If you can find him, exactly (laughs) but yes you have to be involved at grass roots level you can't be distant from it I mean you are emailing now but you have got to a certain level before you have been able to do that, had you started out and it had all been done by letter and email you would have got no where*

J *I know just kind of chucking over the wall mentality, I think the wall has to go, it is almost like in art you call it a residency but you spend time in context with the environment and you are working away*

RB *Method acting for the artist, you have to be aware of all the other aspects that*

J *And the best stuff comes out of the coffee room, the best stuff comes from the accidental*

RB *The remark*

J *Chance encounters that you have, not the kind of orchestrated meetings, the*

best stuff comes from you spot something on a screen when you are walking to make the coffee and you go through MR and maybe and Lucy and Lindsay has got something up on screen

RB *Oh go and show me that, but being here now you have had that whipped away now if you like, you don't have access*

J *Well that was my bone of contention just being bulldozed, I've got no choice*

J *He has basically, I'll tell you after we finish this. So lets do one more thing Scot actually before we finish which is a diagram.*

RB *Oh don't tell me I have to draw*

J *You don't have to*

RB *Art was never my strong point*

J *It is more just like a visual hypothesis almost*

RB *I feel that art is very good representation of cloud*

J *What do you see*

RB *Draw legs on it, it is a sheep*

J *I'll give you the blue chalk, blue for Dundee. This is a sort of, this line of interpretation and I'm going to call it a truth at one end a science truth, there is like an ultimate like image that would tell you exactly what is in the body and no one has got this, it is impossible but everybody is striving for that, that is the Holy Grail and MR sits somewhere here, it is like that is the diagnostic images isn't it and then at the other end you have got the arts and they are striving for a truth as well, they are striving for like to describe the world in a way, things that perplex them like Damien Hurst puts a sheep in formaldehyde and that is the extreme version of his pursuit of truth, he is trying to tell you something that you can't describe through his practice and equally Picasso they all do it so lets just stick with a huge kind of bubble, clinical imaging, so my images probably sit somewhere in the middle of this, there is a degree of interpretation and there is like one quite close to the data but they are not far enough away that they are abstract but they are completely impenetrable but they have a degree of interpretation and that is the ones we show the patients and then you have got like some other ones like that are vertrible arteries they are kind of like here and sort of getting towards this abstraction, they are not really much use to explain what is happening but they actually offer some sort of other insight into the body, so that is like one diagram and that is very linear and it is a very scientific way of fitting a very complicated argument really, it is probably too simplistic and then you have got another one which is basically you have a central point of science and art and then you have got some of these MR images and they are not quite the central point and then you have got my commissions that are like this, they are not quite and some are sort of both and they kind of cross over and they sit in the middle here in this cross over period and maybe that is what we show patients I don't know, so you seen what I mean there is like a sort of way of reflecting*

RB *I think though that is flawed because why are they mutually exclusive, why is*

artistic truth not

J *It is too polarised*

RB *It is completely wrong because you can have images that are artistically like the kidney one, now scientifically that is actually an accurate representation because you have volume round it, you have got internal structures, external structures, you have got colour, you have got lighting so you have enhanced if you like a scientifically true image to make an artistically true image so I mean that is the same, your image of the kidney for example is taken from what you would take as this and what you have made it is this, from that data you have ended up, so they are not necessarily mutually exclusive, I don't see that you can have artistic truth at one end and scientific truth at the other end*

J *It is almost like saying the same thing*

RB *Well it is, it depends on what you are trying to do and artistic truth I mean I know what you are saying about sheep in formaldehyde however how do you determine what artistic truth is*

J *Exactly*

RB *That is not reality that, that is the abstract*

J *I mean there is no such thing as abstract, I mean this doesn't, this word is a taboo word in sort of the humanities you would never say that word 'truth' it is something out there*

RB *It is perception, you can*

J *It constantly moves as well, it is not actually a, it is a constantly evolving thing*

RB *All the world it flat, that is a truth, oh not its not*

J *The World is at the centre of the universe*

RB *That is right*

J *So you could almost like scribble these out and you could actually say that these things are actually, they are not polarised they are actually one of the same thing*

RB *And where you are most successful imaging was and you were successful communication was and it depends on the person, some people are scientifically ?? people prefer art so a combination, again all of these if you show the MR image and the other image you have got the best of both worlds, there is not point in just showing this image because you have nothing, well that is lovely but this is what it has come from, this is, you can point out bits on this, this is a representation of it, I think you have to use them*

J *Maybe you just have a diagram that is sort of like this image centre, this is the image and it had got things that it could be, it has got things that are keyed into it, it could have an arts context it could have, it has got attributes*

RB *And what do you want to use it for, you have to, rather than create an image*

and see what, what do you want to do with the image, what is your main aim, do you want to just have an image that looks like an advert, do you want to use it for information, for education

J *So it is all about context isn't it*

RB *Yeh because it is very hard to get an artistic image for diagnosis and I mean I think that is where the science bit come in, for the pure medical side diagnosis and I'm talking medical science this is where you are but to give it a wider audience most people are not in this, in here, most people are sort of round here somewhere or in here*

J *You need the training*

RB *Yeh and people don't have it, you have to have somewhere to start, it is much easier to look and listen to pictures and signs and if you are adding, you can add sound effects well you know what it is like they do it up in ?? you hear the baby's heart, now doing an ultrasound probe on a ?? babies heart you can hear it, if you are adding sound to your blood flow, woosh, woosh there are so many aspects to that, that is easy for general population to understand on an artistic*

J *Yeh they can use bits of this and bits of this*

RB *Yeh you are using your senses on a more base level for this than you are for that, that is more analytically, you are actually having to think about things whereas you are seeing it, you have a picture and you are hearing some blood flow, it is just there you don't have to have that, all somebody says 'oh is that the way' instantly there is a recognition that here as I say what is useful to have because they use it ?? this is what is ???? and here is a picture of it, the two go very much hand in hand but it is whether you target the image to your audience or the audience to your image, do you just go ahead and produce an image and go right, what is that used for.*

J *Well the way I've been working is just producing images*

RB *And then say 'where does it fit'*

J *Yeh, but by producing them with things in mind, I mean obviously if the starting point was for patients when I was working with Graeme but I think as the work went on and I started to mature and develop sort of skill in developing the images there was a broader spectrum of people who could access this stuff, I mean everybody wants to know what that is about but a lot of people want to see the kind of beauty of the internal body space, it is like these programmes that you watch like you see the baby in the womb and you think wow and everyone talks about it for weeks and you hear your grannie talking about it, people have an appetite to really understand but that is different from a one to one in a consultation where it is much more focused, they don't want like a two hour documentary of how the baby developed over nine month they want like what is that little blob mean*

RB *How does it affect them now, what can I do about it, is there anything that can be done, is it bad it is good*

J *It is like a feature length film versus a TV commercial, you have got 20 seconds to sell Flash or you have got like two hours to tell a story of the Vietnam war, it*

is a bit like its an epic versus a commercial and effectively when we are in the hospital we are dealing with the commercial model and we are trying to sell things but use art and use some of those tools, condense some of those tools into something that you can use in 20 seconds because you don't have like two hours to unpack everything and it is a bit like artists that work on TV commercials they would all love to make movies but they end of knowing that making TV commercials makes them more money, well that is the model and if you are a visual effects company you will make more money making 20 second commercials than you will making 200 million dollar movies, because you only get a small percentage of that 200 million dollar movie

RB It is the actors

J Whereas in commercial you get it all and there is like a middle man, there is an agency will come to you and they will bump up a price so it could be huge for 15 seconds, it will be a big budget and it is virtually all profits, small turn around

RB I think where your images are concerned you would have to, it is very difficult to know, what you have to do is have it generic enough that it can be used for lots of different other things but without being blah, it has to be able to be, I mean you must have started out, okay I started out trying to produce an image you must only get to here and you think oh am I going to go this way or this way

J Yeh there is a sort of fork in the road

RB There is a point where you go, well am I going to use it for mainly diagnostic stuff, em, no that is not the work, or we are going to use it show patients or we are going to use it just as a generic thing for information so you have to make decisions but you don't just go along and end up with a final image and then say 'right no' because you haven't done, and what you have done is that you have gone so far along and then you think, oh actually this would be really good for showing to patients and you then gear it towards that, there is nothing to say you can't do both

J it is weird because I think probably away back I didn't even expect to be able to pull the data off the scanners, I mean that was the very first ?? of the project, I thought that was going to be the project, but I treated that very rapidly and realised that

RB Where to you go from here ooh

J Exactly and then just open a can of worm because you can get access to all this stuff and you can take it off the scanner which is always the big problem it is like you move G file into another machine and it doesn't open and

RB Yeh compatibility issues

J And everything was like on one workstation that was only accessible by one person in medical physics who knows enough to be able to read it all and deal with it so it is like accessibility issues but as soon as you can pull the 3D data off and move it into something else

RB Are you using mainly volume of surface

J Well it is a surface, it is a special process that generates a surface that then

generates and isosurface because it is not a surface rendering in the volume sense, so you threshold it right, you generate a surface and then it runs an algorithm on that surface, on that volume surface that you have got almost to generate surface patches like, ??? surface like little triangles and it knows the slice thickness and it knows that everything of that intensity value on that surface is the boundary so it generates like a plaster cast

RB *And then you can add the internal structure, you can make it the external plaster transparent if you want, which is what you have done with the kidney*

J *it basically just generates X and Y, at X, Y and Z points, it takes like, this intensity here is the boundary and I'll generate an X, Y and Z co-ordinate here I'll generate one here, I'll generate one here, one here and one here and one here and it will generate all one round and then it knows to slice thickness so it says like okay*

RB *One gives it positional data, yes*

J *One mil I'll generate another one and it does this*

RB *It gives it a smoother*

J *It can do you can leave it quite jagged but I just run the smoother which basically just takes the tangent, it generates a tangent sort of like, I think it averages it so it averages to where all these points, so you end up with that instead of that, but in doing so*

RB *You have lost integrity*

J *Yeh*

RB *As soon as you start interpreting things and deciding that the data is there and what we will do is we will just add data tot he middle of it*

J *That was what Sue was saying, Sue was saying that but I think Sue because she doesn't work in radiographical images doesn't realise, well she probably does to an extent, ??? images are interpretations as well, they are not actually true reflections of the anatomy, I mean the only true reflection is the stuff that she sees, she cuts*

RB *Yeh that is real, that is real there is no interpretation there that is reality and what you tend to do is strive, as you say, you have gone full circle because you want it to be real but oh not just quite*

J *And I think I'm living in that, I think I'm pulling back from that realistic domain I don't think that is the end game I want because it doesn't actually tell the story*

RB *Well it has to be a comfort, you have to be showing it to people who go, right that is a kidney, that is a picture of a kidney but it is one that looks just like a kidney rather than, I mean that is fine but now unless you have got red and blue and yellow and lighting, I mean there is even lighting effects on that, however in black and white it is not the same and once you add, I mean a hundred years ago that was a beautiful work of art*

J *He has put like a grotto in the background and it is like a landscape so he is*

using the vocabulary of his day like I am, I am using like 3D computer graphics and people will look back and say well why the hell has he done that, I'm not going to the grotto background but it is

RB *It is a similar idea, and you have got little blood cells flowing through it*

J *Well that was very common at that age they always*

RB *The trick is to be able to try now to think what people will think in the future, if everybody could do that it would be*

J *I would a rich man*

RB *Oh yeh wouldn't you*

J *Well Scot I better call it a day there if that is all right*

RB *That has been super*

J *That has been really useful actually there are some really good points in there.*

2.8. Designer A

Interview with Designer A
Date: 18/10/06
Time: 14:00
Duration: 1:15:43

J *Now we are splitting up the room into two halves and this half is for some discussion and dialogue after we look at the images and this half of the room is where we are going to view the images so we will walk over there and then I will let you see some of the work I have produced on the project and I'm going to show you some of the images that we used to construct the 3D work and we are just going to discuss, I'm going to ask you about 3 of 4 questions based on the images you are looking at and I'll give you some time for reflection and as I said feel free to ask any questions at any time, I'll also give you some introduction to the imagery so you are not looking at it blind in the essence of context what you are looking at and some are really abstract and so some kind of background to what we are doing and then after that we will come here and I want to talk a little bit about the origins of the work and how we produced in terms of the process, how my working practice work and how that may affect integrity also, so obviously you will have an idea about how you think is integrity and origins in the process but I would also like to map some stuff out, a small fairly short and sharp anatomy exercise to sort of tease out how we might represent the integrity of some of this work but again it is very short and sharp and we if we were to go to any depth it would take days to do it but I'm hoping to cover just some of the key issues*

DA *Just from the start what is your definition for integrity*

J *Sure, sure it is evolving constantly, my definition of integrity started very much embedded in science as a science of integrity and some closeness to truth and add clarity it had a reproducability, it seemed to offer some sort of solid ground to stand on and that was what I thought integrity was and it seem to be honest to me but that is not the way I feel now after doing all this work, I feel that much of the imaging in a sense its integrity is does have, it is certainly what it is all about it is constantly moving it is certainly what it is all about, it is constantly moving, it has some degree authenticity and I always undervalue the authenticity of my work, I often thought my own work didn't really have an integrity that at that point I doubted integrity too and I thought it was a bit airy fairly, it is, they are beautiful images but they don't mean anything but as I've kind of gone into the PhD, that shifted I feel that they do have value even the poetics of the image actually have embedded language that they have some integrity, it is not the same as the science part it is in some ways you can't really compare it as it is different in value, I'm not going to save someone's life with one of images but what I might do is give someone a feeling of how they body was constructed and a doctor could make a diagnosis from image it doesn't have that form of integrity but what it does have is it offers insight in what is why the human bodies have all these bits inside you, it give a humanity and I think that is sort of a different type integrity than the one I used to, but a different type of authenticity but I'm still playing with that I'm still trying to think, I'm still trying to build an armoury what*

integrity of what I think is integrity and how that relates to my professional practice, do you know what I mean, I don't know if that answers you question

DA *Yeh it does, I have a clearer sense of where you are coming from*

J *And I suppose this is what today is about, today is about trying to get other peoples, how other people articulate that shows integrity based on the fact that it didn't come from the clinical imaging background, design and fine art and I think all are different opinions my work and I'm keen to document that and I think that is really important as par of this academic process, I am keen to gather that and not just based it on just the sort of ??? so will we take a toddle along there and we can maybe go through this stuff. If you stand at the mic there that would be great and I will just grab these remote controls, it is quite a good mic so it should pick up everything we say I hope, it has done so far so hopefully not too many noises outside in the corridor. So basically the screen are split into two Mike, the first screen ahead of you is going to show you some of the medical data that has been used as a start point for me to building these pieces of visualisation and animation and on this screen I'm going to show you the visualisation on the 3D work but I'm also going to give you some background to what you are looking at and leave some time to reflect, so I'm going to start, there is four key areas of anatomy that we are going to cover and the first one is called the artery, and I'm just going to put up a couple of sequences here and just explain to you first of all what they are, obviously if you want me to slow down or speed up just let me know.*

DA *Okay*

J *The first image that you are looking ahead, straight ahead of you is an MRI image and it was taken at Ninewells hospital and it is a series of cross sectional slices so it is not an animation as such it is like slices of bread, it is a cross section of slices taken at one moment in time through a patients head and neck and the areas highlighted in white are the areas of high signal area which are blood vessels and these blood vessels are carrying oxygen an blood to the brain which you can probably see as we go through the cross sectional slices and on the left hand side this is the same piece of data and it has been reconstructed, it has been relit, it has been texture altered and the camera views have been set up to pan round the object and it looks, it looks about 10 seconds and maybe I'll just give you a few seconds to watch it through and reflect on tit and then I'm going to ask you a series of questions. And now I'm going to ask some question*

DA *Yes, sure*

J *The first question, there is two, well there is four questions Mike and the first two are linked so I'll ask them together almost, the first one is please describe in your words how these images provide insight into the human body and how would you describe the visual qualities of each image and make comparisons where ever possible, that would be good.*

DA *Okay, this image straight ahead of me should be telling me quite a lot because it is an actual representation of what is going on in the human body and I understand this thing about taking slices through, I find it very difficult to read, I'm trying to imagine what those slices mean and how they fit together and I can see that there are different layers of complexity, since it is represented by that four I'm looking at on the left , the model you put together I find much more understandable it has got clarity to it I can see how it fits*

together I can imagine how tat fits together inside of me, sorry what was the other question

J *The other question is describe the visual qualities*

DA *Well the visual qualities of the actual scan image, em well first of all literally it is monochrome it is two dimensional, it is highly abstracted so you actually have to have a lot of knowledge about how the image is made in order to understand it and in your head all the time you are trying to put all these different elements together and think okay how does that fit, so when you first showed it to me I was trying to do that and actually quite unsuccessfully, the visual qualities of what you have produced are actually sculptural, very accessible, it actually a really interesting form, it is not quite symmetrical which gives it a particular interest, it is complex you can actually read it, yeh so it is interesting, it has a kind of beauty to it in a sense and it is readable.*

J *Okay, did you feel that the interpretative image, or the image has some degree of interpretation although tethered to data has some sort of form and structure, do you feel it has less integrity due to the fact that it has some form of interpretation that has moved it away from the scientific raw data*

DA *Well it is like saying you know there does an ordinance survey map lack integrity because it is not an actual piece of physical earth that you are looking at and I think a map and that is essentially is what we have got a 3 dimensional map and that has integrity if it is seeking to be honest to what you represent and it can represent that in other different ways and well all know how mapping can be used in different ways one can move, one can have a literal representation of something, you can have an abstractive, w can select certain types of data that are actually on the map and that is precisely what you have done there, so the advantage of that, I mean to a large extent whilst this image here I'm looking at it almost reminds me of something from the 1960s Dr Who series, it is kind of, it is something weird going on there but I don't really understand it, this I do understand, this I can relate to and this yes I think it has integrity because I'm assuming that it is an honest representation and you are the only person that really knows, but yeh assuming that is what you have attempted to do is to accurately map and yes it has integrity*

J *That is interesting because it is almost like the onus is on the artist to be honest about his work, if you know what I mean, it is almost like what you have described is you have picked me and okay I trust the integrity of is based on the fact that I know, I would hope that you have made a honest representation of that work and it is almost like up to me now to then authenticate the integrity of it almost in a sense isn't it*

DA *I don't know*

J *You are the first person that has actually asked me*

DA *Well I'm not the person who can authenticate what you have done because you know it is not in my knowledge but a clinician would know if that is an accurate representation or if you are seeking to be accurate, a clinician would also know if you had actually got something worn, I haven't a clue but you know I'm looking at a map of a place you have never been and thinking well I'm sure this represents it, although once or twice once or twice in my life I ended up in a city, I've been given a map in a totalitarian state where key parts of the city weren't actually on the map because they didn't want you to have an accurate representation, they didn't want you to go to that part so it just didn't matter and then that gets you in to a whole different territory*

J *I mean there is more context in that sculptural piece there is no soft tissues in a sense because I have not put the head and shoulder s to give any reference I was keen to try and work and focus attention on the sculptural nature of the form rather than actually the external data that the science instrument is collected I have almost filtered and mediated to go from one, so in some ways you could regard that as slightly dishonest that I have deleted things, as I have deleted the muscle and the parts that don't really mean anything in this case because it is just the vessel that I was interested in*

DA *I don't think that is a question of dishonesty that is a question of accessibility and necessary simplification, em*

J *Okay I'll move on to some other images because there is a few I want to get through and the next set of images are based on the same piece of data they are from this scan, I'm just going to put up a still of this vertebral artery scan, I'm just going to put this up just for reference so we don't have any movement so it is a fair comparison and I'm going to jump to some still images and these images have had a, they have had an additional piece or an additional level of interpretation or you might regard it as an enhancement or a dilution of the information but I have changed them. I'm just going to take you through four, I'm just going to scroll through them and then I'm going to stop and warn you and talk about one. I'm going to pause it on this one Mike and I'm gong to ask probably ask you a similar set of questions first of all if you can describe to me what insight this image offers into the human body and some of the visual qualities that you see in this image, obviously you have got this one as a comparison*

DA *We are still with art yeh*

J *The same thing it is exactly the same, it is just a freeze frame on that imaging sequence*

DA *Well much like that the last one, it give me a insight into to actually how things fit together and the internal forma and structure and things em, yeh that is what is tell me, again you have got a really intriguing image there so in terms of visual qualities it is em, I actually because part of it is fuzzy I find it more difficult to read than the previous one In terms of what if represents but it is visually it is interesting and intriguing*

J *To give you some background on this particular image, I have adopted and I've changed the lens and changed the kind of visual language in the previous set is very much sort of computer graphics and 3D it is very rich and you are presented with a lot of information simultaneously but what I have tried to do is almost like a discourse of photography in depth and field to try and draw you eye towards the looping of the vertical arteries to move you away from the other parts of the data so you can see this kind of structure and partial symmetry but I don't know whether that adds to realism or subtracts from realism, I don't know how that affects the authenticity , when you use this kind of analogue it affects the existing photography*

DA *It would depend very much on the context on which that images is being used and it is actually a difficult question to answer because depending on the context, I mean you can read it simply, you can read it simply as painting and yeh really interesting and in the way that the form actually draws the eye around it etc, etc in terms of reading this, what is going on inside you head in there em it would draw your attention to certain aspects of it, em but yeh it depends on how it is being used and what the context was and whether its, but I do think it has any more or less integrity because it is all about one context*

J *And do you think it is an enhancement or a dilution from the original sort of 3D image construction*

DA *I think it is neither, because it again depends on the context, that if it were, it was important on the whole of the structure rather than a dilution but I can see why you are trying to get a sense, you are trying to focus in on something, what ever reason then that could be an enhancement in terms of a patient or a clinician*

J *And do you think in terms of context, in terms of the objective in trying to achieve if it is for a patient, it is for an art gallery space, is that what you mean in terms of context*

DA *Yeh*

J *Okay, we will jump onto the next set of images Mike and these are images of the kidney and obviously we are almost working our way down the vascular system so we are started off in the head and neck and now we are working out way down to the sort of abdominal areas*

DA *Can I grab my coffee*

J *Yes of course. So just to describe what you are looking at here Mike, this is an MRI image straight ahead of you and it is again a cross section of slices taken from front to back and the reason why this scan is performed was on a diagnosis of a vascular condition called renal artery stenosis and this is quite a serious condition that occurs when the vessels feeding the kidneys become*

blocked or narrowed due to a build of what they call arterial plaque, gunk that blocks the tube basically that feeds your kidney and this is quite dangerous and they have to usually perform surgical intervention to deal with this and I can actually show you on this particular scan where this is, if I pause it in the right place, if you look to the right hand tube you will see a sort of pinching and that is bad news

DA Right

J So anyway this is a larger scale image of the vascular system but from that I have managed, I have then got a three dimensional reconstruction of the kidney on the left, actually the healthy kidney using that same piece of data and I used this and it has been digitally relit although, and transparent shaders and textures have been added to give a certain surface quality and it has also been isolated from the rest of the vascular system, so it is sitting on its own, so again based on the questions I have asked you before what insight do you think these images provide within the human body and how would you describe their visual qualities?

DA The scan image I'm looking at straight ahead of me is, reminds me of 1970s Czech animated films it has got really wonderful quality of being hand drawn and something a bit abstract going on, something sort of figurative in the middle, I know it is a kidney because you told me it is and I can make out the form of it but it means nothing really I mean in terms of understanding what is going on in here I haven't got a clue. This is much more understandable it looks a bit like one of those things that you buy at the butchers or from Tesco em I can see how it fits together better than the ones that I can get at the butchers, I can actually see through it, so I have an understanding of its form, its three dimensional form, I have no understanding again as I did with your previous images of the internal complexity and how all that fits together em the fact that it is well lit, virtually well lit, enhances my understanding of the form, I have absolutely no idea from that, if I did not know what a kidney looked like that would be meaningless, absolutely meaningless the image I'm looking at.

J Okay and do you feel the image I have produced is a direct interpretation/visualisation of that has less integrity or more or is it again which context

DA Less or more than this that I'm looking at ahead?

J aha

DA Much more because I can't read that I don't understand it, em I need to be talked through it and explained, that has a huge amount, all the images each have integrity because, yes it is a form I understand, what I didn't understand is the internal structure of it which is made clear by the way you have done it. The fact that you have used that kind of moody lighting I think enhances I think enhances the integrity of it because it enables me to understand the form, okay you going to actually think a kidney looking like that but that is not the point, the point is it is about being able to read it, it is about mapping it out and I've got a bit of an obsession with mapping at the moment and this is what is assumes but a good map is what you are aspiring to produce here and to my mind that does the job.

J *I think something that someone said before not in this experiment but in the past and it was probably a collective kind of saying that came out of our discussion it was, if you have the functionality of the arts factor in this case the kidney and you are keen to get an insight of the functionality but functionality can be be quite threatening and scary and the structures could be and the language that maybe I'm using is giving an opportunity to be, you are being sucked in by the visual quality but then it is dragging you round with some of the functionality, like you say the form, I don't know if that is fair or it is almost like holding your hand as you kind of go round the fair, the kind of complex object, the lighting and the structure, or is that too poetic?*

DA *No, again it comes back to context, it comes about who are you doing this with, it is kind of, I'm thinking of, I bought my little boy, no I didn't buy it it was someone else bought it, a model of the body where bits are coming out, lungs comes out, heart comes out king of plastic components different colours, very em, I think I was playing with it and fitting it back together he knows where the liver is and where his tummy is stuff like that and it gives that basic structure however, I've seen in other toy shops ones for teenagers which have many of those qualities where you produce there where there is a richness to it, there is a complexity to it, now that would not be for a 6 year old, a six year old just actually wants to know what, where, what is the shape of the kidney and where is it and that is what they take and of course it then depends on who you will be using this with and what kind of patient and what their knowledge is, I mean it could be actually for some people that that would be too overwhelming and it depends on how ill they are, it depends you know for some people you might want something that is very much an approximation and not as realistic as that.*

J *Do you think it dilutes or enhances then, are we agreed that it is an enhancement of the original start data*

DA *We are agreed completely it is an enhancement of the original start date, the issue then is what is appropriate for a particular user.*

J *Sure, sure, do you think there is images that have dual functionality that con function in different context and move in and out?*

DA *Yeh*

J *Like, if we are going back to maps can you think of the London underground guide, you know it is a very highly useful piece of design but it can also sit and be the V&A quite happily on the wall it could be judged as apiece of aesthetic work and not see the function of it, I don't know can you separate those out or do you think they are totally*

DA *I think it can work in different ways, that is a really interesting that you brought up because I actually don't agree with the idea that the London tube map, using your term has integrity simply by virtue of the fact that it makes out that Kings Cross to the Angel is a greater distance than King's Cross to Highway in Islington and in fact Kings Cross to Highway Islington is three times the distance than the other one, the map actually doesn't work apart from telling you the relationship between different tube stops but you actually, it simplifying too much because it is essentially then dishonest about the structure of a city that is it trying to represent and that I have a problem with, you know it is a beautiful idea but there is something about it that I'm not*

entirely happy with because for years I probably, well in fact I used to walk from

J *You thought that was a short distance*

DA *I actually thought one was a shorter distance and in a matter of fact it wasn't so I thought the map is wrong, this was when I was a student in London and I couldn't get over the fact that the map is wrong, the map gave me the wrong information but it depends on context and the extent to which you have to over simplify something em I think it becomes problematic when you have to misrepresent something, it is all right to strip data out, right down to a bare, you could just be a solid object and maybe some people don't want all that detail but it was like if you were presenting that to ?? now that I wouldn't have a problem with*

J *You have almost gone far too down the line of ambiguity and abstraction that you have kind of lost track of what it was you started out doing*

DA *Yeh*

J *You have moved its integrity into, I don't want to use the T word but it is different type of truth you tried to explore something else that is very far away from its origin point, is that a fair assumption?*

DA *Yeh*

J *I mean it is interesting just looking at this scientific image and it touches on what I've said to you earlier when you were asking what I thought integrity was and where I, what I started out thinking integrity was in the point of this PhD, I mean it is, the radiographers that have looked at this and some of the physicists have looked at this and this again is not a true reflection of reality this isn't in the sense I mean we are obviously we are not black and white we are not that type of reality but the kidneys aren't actually that shape necessarily and you are very much, you know if they push one button they can change the way the kidney looks just because what the MRI scan is doing it is measuring it is an instrument measuring the proton density of material now if the change a setting on the instrument they can get a different reading for the proton density it can be a different wavelength which is represented in the different grayscale value so in actual fact you are trusting the honesty radiographer of the operator of the equipment that they are following the protocols that have been reproduced over time but even then they said even if you are critical there is a degree of art in this because it is taking a photograph it maybe not a camera lens and light it maybe proton density enabling it still has a degree, a degree of craft to it because it is learnt over time, experience, interaction with the equipment, it is not something that somebody straight out of training can do so it is not necessarily, I mean doctors don't do the scans because they don't have the experience they just read them so they have a specific person who trains to do this and learns it and the older they are the better they become because the more experienced they are so you deal with all these issues of integrity but when actually when you pare back what you think is the gold standard, the scientific gold standard that we all trust and we all know and we all bow down to*

DA *It is not at all*

J *No it is like the bit at the end of the Wizard of Oz when they get tot he end of the Yellow Brick Road and it is a little guy behind a, operating this machinery that is the wizard and not this powerful individual that they thought it was, but I'm digressing slightly. I want to show you another image*

DA *I'll just pop this down*

J *Yeh sure. This is another image, it is the same scan data, it is the same piece of kidney data but it have been completely lit and set up in a different way to give a different type of feeling and emotion in the viewing and I just wanted to get your thought on this Michael and what insight you think it gives to the human body and how you would describe its visual qualities*

DA *You are talking about kidney again, that is fantastic I love that absolutely love it it could be a piece of ceramic, it gives me less information about how the internal structure and to be honest probably give me less information about the three dimensional form of it, it is more abstracted because you have pared it right down just to a solid object, it is a very intriguing form, personally it is less informative than your last image but it is quite compelling to look at and I think because you almost you think it is a skull it has that kind of bone like quality, oh interesting*

J *I mean to give you some background to give you something to look into I mean the whole objective or the reason why I wanted to, there was two things I was trying to achieve and I'm sort of semi obsessed with the fragility of the human body in the fact that it is such a really finely tuned instrument and it is very very sensitive and it breaks very easily although we thing it is fairly robust and it is not robust at all so we are exposed to some of these things that I see a lot of what I see the conditions in my images and I get a real kind of looking glass into this world and I am kind of amazed at the complex constructions but also how easily broken they are so I think what I was trying to do with this was to try and achieve this feeling of (1) fragility but also tranquillity just through the lighting and with cameras I find that some of the images I've made are fairly intense and they almost, they kind of have a sort of like intensity which is probably partly down to the way I was feeling at the time because I was discovering all this stuff and it was frantic to achieve and build lots of new work but now you know, it is quite new this work, I'm now kind of in the process of evaluation and reflection on the work and how do I really feel about this stuff, I mean on the one level I was trying to achieve an image that could communicate but in some ways could images communicate more than that, could there be like an emotional level to the communication, it is not just about the form I suppose, but it is still taken from the kidney*

DA *There is something fantastic about the scale of it actually, I suppose because the other image was more analytical in terms of showing the internal structure but this is just kind of awesome form and you must have seen that or heard of at least that exhibition that was on two or three years ago I think in London which was*

J *The Gunter Von Hargen body something, I know the one you mean, it was one Brick Lane?*

DA *Yeh*

J *I went to it yeh*

DA *I didn't go to it, just didn't have time I think but that idea of showing me, drew attention to me internal structure of the body, I think you are doing it brilliantly well but you are doing it in different ways and actually the problem with that exhibition is that the shock and horror and of it as it was real bodies detracted from what it was trying to do, I mean you are not doing that you are showing me intriguing beautiful nature of internal, and internal structure.*

J *Do you feel that has a integrity of its own then over and above the data I started with, it is a different type of integrity from the transparent one it has got a new type of integrity or*

DA *Yeh, I think it has actually got a real artistic because it is actually, it is obviously very considered well all the things you have shown but there is actually something about how it lies, the angel the clever looking into it, you have got this interesting form coming out here the way you considered how it fill the frame, you know that is, there is a lot of tacit artistry has gone to that*

J *It is funny because it is almost like the more images I do the more I am articulating what you guys are looking and helping me, talking about this because I'm gaining more insight as each person comes along so by the time I do the last person I won't need to interview them but it is almost like I have done a residency in a hospital I've been there I have been sitting and absorbing like through osmosis I have sort of gained some insight but I can't put my finger on, I can't describe it really I mean I probably could if I had another couple of year to just sit and think about it but you just as a creative person you just can't, you draw the functionality almost, this is how I make an image it is like a functional inherent to communicate to patients that is*

DA *Could you rapid-prototype the project up now if the data is*

J *I have done yeh I've got lots, yeh you could do whatever I did one in wax which is 75% scale of that very kidney because I wanted to see what it felt like and it does feel like the way it looks, because the beauty is that you get these sort of little like landscape undulations like a, you get all these little dents and sort of like indents and they are kind of compound curves and you get these little bits here and then you get this kind of cavity in here as well which is kind of dark and you get the sort of bulges here and the really interesting thing is you know how they images are created and I knew this from the start but I never thought about it in any great depth, not in how that images was created but these images are created by injecting a patient with a contrast agent so they put you in the scan the radiographer basically has a trigger, it is a trigger a gun trigger and she sits and she runs the scan and when it the scan gets to about here or gets to here in your neck she deploys the needle and the needle actually goes into the patient and deploys the contrast agent it is like something out of James Bond and then at that point the scan runs and it shoots through the arteries, it goes through the system so what in actual fact that is it is where the blood gets through the kidney, that is, it is a flow representation it is like pouring plaster of Paris into an object so you get the internal structure, so the actual kidney if you look the actual external part of the kidney you can just see that the film round it so in actual fact what that is, that is the healthy part of the kidney that is the cast of where blood gets through your kidneys so if you are sick your kidney is actually very small in there on this process but your kidney is actually big because the blood is not pressurised and sufficiently, so you get this kind of obscure*

because of this narrowing this disease process, but you could never, I often think it comes obviously a bit from my design background, imagine trying to build something like this, imagine trying to build the subtlest of these sort of undulations in your work in a piece of like marble or a piece of whatever material it may be it would take you a long time to get the subtitles that you can, because the human body is so complex, sorry I've rabbited on a bit, sorry.

DA *No what I'm thinking about is that can see these in an exhibition but it would have the stunning presence and real intrigue to the form of that.*

J *You can see you body in a new way. An interesting thing that you get as well which I noticed a few time because it is you often get lots of anatomy you often get floating bits of anatomy because it is like measuring proton density sometimes like bits of tissue are really, they have got a really high signal and bits that are attached doesn't so when you go through this reconstruction process you have often will have bits hovering in mid air, you have bits of tissue hovering so I think in actual fact that little dollop, this bit here isn't actually, it isn't connect it is like just a piece of tissue just hanging in the cavity and it, okay that is really interesting Mike, but we will move on as we have a few more images to get through, you have an interesting insight into that one. We are going to move down to quite a kind of morbid or life threatening condition called and aneurysm I don't know how much you know about aneurysm but they are fairly life threatening and they are quite common in Scotland just due to the lack, the prevalence of heart disease in demographics and lack of good diet and lack of exercise these things happen quit a lot, I will show you this, this is a CT scan so it is not an MRI scan it is using x-rays instead of proton density but it has a similar visual quality but basically this image in front is a CT scan of the main artery that feeds blood from the heart called the aorta which is just above the spinal chord and these are diagnosis images to detect a condition called abdominal aortic aneurysm which is basically a budge at the bottom of your aorta which is just before your arteries split at your groin for whatever reason you get a sort of build up of, often these calcified deposits or hardening of the arteries and it caused an aneurysm and it caused a budge and it gets bigger and bigger and bigger and I think it has got about a 90% of dying if it bursts unless you can get to Ninewells in 4 minutes so it is really quite dangerous so they usually try and diagnosis quite early and this is a reconstruction of that same condition or basically that image has been reconstructed and represented in a way, now I haven't rendered this in any sophisticated manner this is the first level of interpretation this is the reconstruction straight from the scanner without any intervention or manicure in any sense. I should maybe start off what insight you feel this images provides of the human body and how you would describe the visual qualities of each one of these images?*

DA *Okay the scan image straight ahead of me the visual qualities, the visual qualities of all the scans actually are perhaps the more intriguing and I suppose because of the nature of what is in the scan but despite the fact that it is visual very intriguing it is actually very difficult I was thinking where exactly, you try and map it onto your own body, your image is clear to understand there is clarity to that*

J *Do you think there is an authenticity to it?*

DA *Yeh, I guess so, yeh I understand where it is in relationship to my body, em, yes it would appear to authentic like some of the others really I know there is obviously less and less in the result how you present them. I must admit this one ahead, I mean the other images are kidneys I can figure that out and also the almost the structure of the arteries up here in the head, neck and chest you can kind of figure it out, this I really don't know what I'm seeing where this does make it clear.*

J *It often reminds me of a pot bellied belly dancer with flaring arms*

DA *It is something about the colours that you have used I find that of all the images you have shown me it is the one that is perhaps the most threatening, there is something rather spooky about it and I think it is a combination of colour and of the form and also the symmetry of it, none of the other images have been that symmetrical, have they?*

J *Not really no. I've got another couple of images as well that are the same image but I've changed the angel of the viewpoint just to give you a feel for the.*

DA *I tell you what it is, I tell you why it is actually kind of scary because it is sort of, we are all used to know what the skeleton looks like and there is this thing here which is kind of hugging it which is grasping it in a kind of, if my doctor was showing me that I could I think I might panic a bit*

J *You think you have invaded by some sort of giant parasite?*

DA *Yeh*

J *Okay and do you feel there has been an enhancement or a dilution in the raw data?*

DA *Well it is certainly an enhancement because I can read it and I can understand it.*

J *Okay, great so we are going to jump onto the last set of images which have animation or they have movement certainly, the have movement which adds another four dimensional aspect to the images, so I'll just give you a sort background into what you are looking at so straight ahead of you is, this is actually an MRI image from a scan done, a cross sectionals can done in Perth Royal Infirmary and the image shows the hear basically a cross section of the heart as it pulses in real time but I must add that it isn't actually a true reflection of real time because the way it is captured, it is captured in a sort of slightly deceptive way, what it does because the heart moves so quickly the scan can't keep up so what it does it takes a slice and then it waits for the*

next phase of the heart cycle and it takes a slice just a second later so overt he pace of like ten heart cycles you get one animation of one moving heart and the image on the left here is a blood flow sequence not this, the reason I have put this on is because the parts that make up this image I've been a bit like a magpie I have gathered the information using different sources so obviously you see the blood moving through the vessel now the reference for that is the heart pulsing and motion so I've used that visual to help inform this so it has not been a direct translation visually I've just eyeballed it to try and generate this pulsing motion, that is the aorta as it splits at the bottom that is taken from an MRI scan that has just been taken from a kidney MRI so that is real data and thirdly the vessels are not to scale and they are very much fictitious and interpretative and they are to add a feeling of the particular flow of the blood through the arteries and in a sense this image doesn't really have much of a scientific integrity in that sense but what is might have is some sort of additional insight so some sort of basic narrative into what is happening in the body and really in terms of insight you think it offers and some of the visual qualities it has obviously one image to give comparison to the 3D image?

DA *Well the scan that you showed me, well your scanned image is monochrome and actually isn't telling me much at all that in a sense of what I don't really know about how my heart works, this is fantastic this is em beautiful absolutely beautiful and on one level it is clear it is simple it is well composed, you have thought about the lighting well highly stylised and highly abstract, what it tells me is about the pulse of blood through the body and if I didn't know about that then actually that is useful in understanding that, to be honest to me that is all that it is saying but it does it in a really attractive way and I think one of the things that I take from your images is this sense of how we can look to the inherent use and complexity of our own bodies and what is going on inside them and there is almost, I wonder if there is a sense of wonder there, there is sense of science there and a didactic vision that you have got to get people to understand the thing is happening or the internal structure but this one I would put in the same category as the big kidney, it is actually not really telling me very much about the science of my body but it is telling me something else, it is telling me something about, I don't know the look and feel the rhythm the form the art of it I guess*

J *I think you have really painted me what I would like people to take from it I mean it is this notion that we are a static entity and that we live and that pressure and flow keeps us alive and when you see anatomy, whenever you see it moving it is always just like static blobs and in this case tissue and I'm not the only person operating in the biomedical visualisation area but this notion of rhythm and flow in the body it is just so vital it is like an echo system and we couldn't function without that and the interesting thing when you speak to the scientists of the doctors is the minute that break down the minute that flow that tidal current that weather cycle becomes distorted like any echo system it has a knock on effect it cause massive problems for instance if you start to build up calcifications on these arteries you are making he heart work harder because it is going, it is pushing, it has to push the same volume of blood down a smaller tube so in doing so you strain your heart, your heart has to work harder even when it is idling so you are putting your heart muscle under more pressure and obviously that can cause heart trouble so you can imagine the knock on effects of even just small distributions it is a bit as well, the physicists told me a story about if you get calcifications and build up which are sufficient enough to cause a major*

blockage it is a bit like when you see, you are looking on the road and you see pot holes on the road, often before a pot hole you see a large pit of like breeze blocks that they have used to fill the hold in and trucks go over the breeze block and because almost like the wheel drops from a height it hits the road below so often you get this pot hold right below a really hard piece of road and that is often like what happens the blood flows over and then you get this sort of spinning underneath you get this blood that just sits, it could sit for days or several heart cycles hidden underneath these little crevices it wear away the walls and the cells, they react they do what they do they have an equivalent to an allergic reaction to that because there is bacteria that builds up there and is causes problems, so even like little undulations in that tube, I mean Graham the doctor I would with said that they put in stents and graphs they put in basically foreign matter into these vessels to keep them open but they pretty much 90% of them fail, 90% failure because the body just rejects it, it dislodges it it doesn't see it as tissue and so they have to replace them so it is a constant cycle and all because this is a knock on effect of something else so maybe if I rewind slightly as I'm sort of prattling on here but this notion of flow and finely balanced instrumentations is probably what I'm trying to say and it is interesting that you picked up on it. I have got two more images to show you and then we will go and have a quick seat and a final chat about some of the issues that have come up. So there is this image and there image after that and then that is it, so basically these two images this is the aorta, so this is another MRI scan of the vessel which is in the centre of your chest there, that a lot of the images have been derived from and obviously this is a kind of 3D snapshot of one of my many sequences and I just wanted you to give me your opinions of what you take from these images and the visual qualities and what insight you think they give, you make take nothing from them or I don't know.

DA *Well they are an interesting contrast one if you like an aerial view, you could actually be looking at the Amazon snaking through the Latin American jungle and the other is taken under water so it is giving us two completely different views of the same thing, em the aerial view is useful as we need to know things in our bodies the same as a river you need to know where it heading and where it is and what sort of form it has but that information in itself doesn't tell you what it is or how it works, to be honest the static image give you limited understanding of that but I suppose that is a more, it is a more micro*

J *Satellite image versus some sort of oceanic*

DA *Yeh and again it is highly stylised and it is very impressionistic but it give yet another insight into what is happening.*

J *Okay, I'll put up the last image, again maybe if you articulate in terms of its visual qualities what insight it offer and also what integrity you feel it has and I must add again as well the same piece of kidney data, that same scan with the pinch in it*

DA *Em, it is like, there is something a bit Star Wars about it, em, it is interesting knowing that, that pinched bit so it is informative, I'm not sure I would like looking at it if it was supposed to be representation of me, because there is something a bit*

J *It is quite intense*

DA Dark and intense about, yeh.

J Really interesting that in some ways that reflected that period of time when I produced that work it was done in a very beginning of the visualisation work when I started the PhD, it was a chance of discovery of very intense work and quite intense images and production and it is possible that could have come through.

DA I think it is too dramatic, the images that we got that really see are the ones that are not trying to be mean and moody but actually bring clarity and accidentally on the way they also have very positive aesthetic qualities to them but that is a bit manic I think

J In terms of its integrity do you think it has an integrity?

DA Of all the ones that you have shown me I'm not convinced in terms of its integrity, I think because it is compromised by too many other things, sure it is based on the scientific data but it is also truing to do something else and in doing that it is kind of loosing sight of what it is doing and why it is there, see what I mean

J I do yeh, that is really good Mike thanks for that.

DA It is very interesting but until we did this I hadn't really, I was obviously aware of what you had done and I'd seen film of it elsewhere and stuff but I hadn't really thought through some of the implications of it and the aspects of integrity or representation and it is, yeh if we have the same conversation tomorrow I would probably answer it in a very different way, I think one of the difference between scientists and designers is that, and you have probably rumbled this anyway I'm sure you have, scientist look into the world and designers project into it so scientists are looking all the time, are using tools to see and we are using tools to project and to create and where always becomes very interesting and baring in mind the fact the tools for seeing are always perfect and themselves are interpretations as you were saying earlier as of course tools for creating, what becomes very interesting are where people are crossing that boundary that scientists are trying to create designers trying to look and it becomes, that highlights these issues of integrity and what is also then an artistic interpretation of what is truth and is truth out there to be discovered. I don't think you are doing anything different, well you are, you are not doing something that is one hundred miles from what Crick and Watson did when they created that wonderful model of a double helix and there is that picture of them standing on ladders after they bolted the whole together that has got integrity, that has absolute integrity, now the DNA doesn't have little jubilee clips holding it all together inside us, it is a representation but what they succeeded in doing, Crick's first comment when he was asked, well would you sum this up he said something along the lines that this is beautiful we have seen the inherent beauty and they were looking at the sculpture that was stunning and that is a large part of what you are doing you are actually drawing our attention to that inherent beauty and dynamism in the sense of movement inside us which actually scientists tend not to represent because it is not a priority for them to do that and I think you have done that but I think at the same time you also made it accessible and I don't think there is an issue of integrity at all, there would only be an issued of integrity if you were trying to misrepresent form and it only became an issue

to me in that very last image where you were compromising it so much, you were overlaying it other areas of representation, there was sci fi movies coming in and computer games and I could see those sort of cinematic references in this and that kind of and there is a sunset in the background and there is a space ship coming over, those sort of reference which then took your mind off really what it was that you were looking at.

J *It is quite interesting that you say that because that is the big cliché in 3D computer graphics because usually it is a domain that is dominated by men my age and we all love Alien and Bladerunner and so it is an aesthetic that you see bubbling through especially among young people that work in 3D computer graphics, if you go on to 3D computer arts website you will either see women with hardly an clothes on that they have modelled you will see gangsters or you will see space ships and that is the three places and I think you always when starting out in 3D you always seem to fall into that trap and then you develop and then you get a real understanding of the issues you are dealing with and the sensitivities and you become more experienced in the media and you are able to use it the way it should be used instead of the way you think it should be used, it is almost like, just in the last five minutes Mike, I don't know if you have the time, I just wanted to talk a little bit about the origins of the work I will just show you a couple, I mean is something that we have touched on and I don't want you to dwell on this too much but some of the science bods have struggled with this but basically when I produce work it isn't a translation process that I suddenly look at an anatomy book, look at the scan and produce this tuff it is an ongoing process it is an ongoing process of referencing anatomy, influences like astrological satellite, sci fi and lots of interests ad also historical influences and there are ways that traditional artists have represented the human body in history and there is lots of books been written and lots of material that you can do and it you look at that there is a lot of ??? in the background of that, that was his way he was a contemporary artist in his day so you are mixing anatomical stuff with visualisation but this was interesting this was looking at Vermeer digital lighting is crucial in what I do so where does it all come from.*

DA *You know there was one point when I was actually thinking about Dutch still life when*

J *That is exactly where that has come, that is why I brought it up because if you follow this is my sketch book, I started to look at Caravaggio, I started to look at Vermeer and then boom then I started to use the lights in the way they should be used the way a painter would use then and not the way a CG artist, CG artists are terrible at this they go for three point lighting they go for a blue a red and just an off shade white and whenever you watch a movie you will see it just look for this lighting that is cliched across it, not all of them do it if there are good art directors on a movie they will make the movie how they want it to look and I was trying to bring a bit of that sophistication in but also even just the dialogue between myself and the medical profession even drawings you know and I think all of this feeds into producing the work and I think that brings an integrity to it, if I was a salesman trying to tell the integrity what I do to someone who is really sceptical about artists working in medicine look at how much I know understand of the human body and how much effort goes into achieving these images and how much sensitivity goes in surely you couldn't say that it has less or an authenticity which is different but I think you are clear that you seem to believe what I believe in some ways and these are the sort of images I'm working on at the moment and this is purely*

interpretative art image and I'm just using this as reference I'm not using the originals scan data I'm building a, digitally sculpting from clay from virtual clay and then animating but purely from my imagination rather than from reference material. So just on those last, I've three more questions to ask you just on those issues and then

DA *I'll take one of the complementary biscuits while you are asking the questions*

J *Help yourself they are from Lidl's they are not from Marks and Spencer's. Do these images affect the way you think about your body?*

DA *Yeh, em, any image if it is done well changes how you think about your body if it is of the body and I think yours will be known in a particular insightful in a sensitive way and that is why I was saying earlier and I was thinking, I was trying to think who was that Dutch bloke with all the still life, rotting fruit I remember his pictures of rotting fruit it had that same, I mean the one of the kidney I just think it is a fantastic I would love that to be made in porcelain, it is just a gorgeous shape*

J *Someone said that exactly the same thing that you said, Edwin Janssen from fine art he said exactly the same thing yesterday he said he would to see a room filled with porcelain versions of that kidney you know on plinths you know a fragile material.*

DA *I could see you mate doing an entire exhibition which would be sculpture, which would be image actually don't refer you don't have to label anything you have got beautiful images beautiful forms and that is one of the real things that has come out of your PhD, of course they have integrity because they have been approached through a process of integrity and there is actually a point at which you can think right there is the designer in me that wants to crack on with all this stuff and we are going to develop a tool that can b used by clinicians blah blah and there is the artist in me that wants to take a space like this and fill with form and get people in and just say immerse yourself in this, this is what you are about this is inside you, this is what I've seen and this is how I represent what I have seen inside you and I mean that is a fantastic outcome I think from the PhD and I absolutely understand why you are going through this process and it is important to triangulate it, my position is in terms of integrity that it is actually not an issue, absolutely not an issue and that is from my perspective I can see how it maybe an issue if you come from a different perspective but as far as I can see in terms of its artist and design integrity the scientific integrity is something else but you are not claiming to be a scientist*

J *No I'm definitely not claming to be a scientist no*

DA *The I don't think it becomes an issue*

J *Sort of last question, what role do you feel artists should play when working with medical scan data do you feel they should be a translator a mediator a illustrator or a designer or all of those things because I'm constantly having to get a feel for what it is my role is because I feel my role constantly evolves it changes and initially when I first started the project I fell into the illustration trap but then I realised there is much more profound input that I'm bringing here to do with mediation between patients and clinicians and now I'm at the stage were I'm beyond that again and I'm thinking is there some sort of*

broader content to this work that you have just described it goes beyond the patient that moves me, this mediator, I don't know what you would describe it as, just a stand alone artist that produces the work for medical imagery it is sort of constantly trying to work out my role but it is maybe not for me to work it is

DA *It is for you to work it out and it is for you to take a position on that*

J *Okay*

DA *And only you can define what that position is, the role of a designer when it comes to their interface with science I believe they have to champion a clearly articulated position in terms of values and they can do that because scientists can't or don't want to for quite obvious reasons and those values might be about what is useful, informative useable those kind of values it might be trying to draw attention to what is commercially financially valuable it might be trying to accrue you might be looking at scientific data and trying to turn that into something that is commercial a product that is taking a value out of it, the other thing that comes over particularly strongly you are doing those other things as well and you had the potential to do the commercial thing but it is actually the aesthetic value that you are taking from that data and the data is just data it is just information about the world that we can then use to articulate a set of values about the world what is important what is worth valuing that is your role as a designer to draw attention to that and to communicate that you are a very powerful communications designer you have perfected a particular way of working and you have also articulated a very distinctive aesthetic in that way of working that places you in a very interesting and quite unique position so you have to take a position this is what I think is significant, relevant and valuable in terms of my contribution to value.*

J *Okay great well, I need a lie down after this.*

DA *That was great I really appreciate seeing all that I think is fantastic work that you have been doing it is really fantastic*

J *Thanks Mike I appreciate you coming down*

DA *It is really good you have worked tremendously hard and have presented it in an incredibly professional way, you make it very accessible and interesting for me. I have to hare off as I have another meeting in 10 minutes*

J *That is fine that has been really helpful and I have got all this on tape so I'm probably going to dissect it all and I may come back to you with a couple of questions or something.*

DA *I really do have to rush unfortunately but that has been really interesting and if you want another chat albeit follow it up*

J *When I get to the point when I writing a lot of this up I might come and pick your brains on a few issues to really articulate them in the thesis as I feel that I have really got a chance to put my wares out and show my original contribution to knowledge in the thesis and I don't want o mess it up I want to get it right.*

DA *It is this stuff that is fantastic it is this stuff the kind of historical precedence of the foundations of what you are doing the Vermeer and all that. Fantastic*

J *You know Frank Gerry based just hear head the head scarf that she wore that was what inspired him to make the corrugated iron it is just an incredible individual*

DA *Well I wish you all the best*

J *I might be running focus group/discussion group but I'll drop you an email*

2.9. Media Theorist A

Interview with Media Theorist A
Date: 18/10/06
Time: 17:00
Duration: 00:57:41

J *There is going to be two sets of images put up Anna and on one side they are going to be very much the scan data, very much the scientific type of images and on the other side I'm going to put up some of the reconstructions that I have produced and I'll give you some background to some of the images that you will be looking at so you won't be looking at them completely blind, I'll give you some context and some background to where they have come from and what they are showing and then we will discuss a little bit about particularly their aesthetic contents that they contain and some of the visual language that they might use and I'm hoping that we can sort of tease that out using a sort of comparisons between the scientific images and the reconstructions, so if I bring up the first set of images on this screen and I bring up the reconstructions that have been built from this. Now this particular image is an MRI scan and it was taken at Ninewells last year and it shows cross sectional information of the head and neck area and it is not an animated image in the sense that it is over time it is over one moment in time and it is multiple cross sectional images, a bit like slices of bread and what it shows is the high signal areas which are the areas of blood, so white areas basically are blood and as it moves up the arteries into the brain, blood and oxygen particularly. The Image on the left here is a 3D reconstruction that I have put together of the same piece of data but it has been reconstructed, digital lighting has been added, alternative camera views and there has been a creative visualisation process taken place and it has been edited to give a short sequence and I will leave you for a few seconds just to reflect on these two sets of images and them I want to ask you four questions.*

MTA *Okay*

J *And the first question is, please describe in your own words these images and what insight they offer into the human body and then there is second question which is related so I'll ask them in twos these questions, how would you describe the visual qualities of these images, so basically what insight do they provide into the human body and what are the visual qualities of each image?*

MTA *Well the first thing which strikes me is the one image of the scientific image which is the image which has clearly got an anatomical inner shape to it, you can recognise some sort of human shape or it is just me seeing it but as the reconstruction is just completely artificial in its representation and whatever it is, it could be anything, it makes me think of something biological just by the shape of it and the look of it but it has lost completely the human or the humanoid sort of reference point, that is probably the one thing that really strikes me, so there is no reference at all, it could be two completely different things and there is no reference whatsoever from one to the other,*

so the reference is not there, the element of reference in the reproduction it is not there at all as far as I can see.

J *The third question is do you feel the interpretive image has less integrity due to its abstract*

MTA *Yeh but you have to clarify for me exactly what you mean by integrity, integrity in t he sense, what do you mean by it exactly*

J *Well maybe the first question is maybe what in a sense do you define as integrity in your own practice?*

MTA *Because I mean for integrity it is a word which has a connotation, a moral connotation of it and an ethical connotation, more stance or integrity of the thinking or values this sort of things so I was intrigued by the use of integrity when it comes to this visual presentation, I mean maybe you are in, and I'm speculating that you are implying here that integrity comes out of being faithful to the original object or the presentation or not but then again it is interesting in terms of being to able to speculate on*

J *Sure, maybe if I give some background and I'm keen for you to define what you think I'm trying to get and also maybe if I give some background, it all revolves round this issues of authenticity in that sense and is one image more authentic than the other, I suspect a lot of it is to do with probably context in the sense of a*

MTA *One could also question the same idea of integrity as being irrelevant when it comes to representation all together because a presentation is such something that you could be completely autonomous from an object anyway and becomes something else, and it does become something else, an autonomous object of art in some cases so the element again of reference which could be irrelevant in some artistic context, it is completely ?? than others, so it is important for me for you to be really think about ?? whether you want to stick to it or not so the purposes is essentially your research argument.*

J *But do you think this image is*

MTA *For me in this case it is completely irrelevant, I mean I don't think that I would, this image comes to fruition to me regardless of whether it was the other picture there and the scientific image on the right, I mean I would have just enjoyed looking at it for example regardless, so completely irrelevant, I would say that*

J *I'm going to stop things and look at some still imagery now of this particular piece of data and I'm going to stop this and show some static images of the same piece of information, but there has been further layers of interpretation been added tot his scan data and these are static and what I'm going to do is I'm going to play a series of, there is really four images and I'm going to just go through each one of them and then I'm going to stop on one and we are going to talk about that one image, and just, I mean this one is more for reference because obviously you have seen them scolling backwards and forwards so this is just to remind you of where it came from, so I'm just going to pan through these for a second then we will stop at one particular image I would like to discuss. So I want to just stop at this image Anna and*

I want to again to revisit some of these questions and we can talk further about this issue of integrity and how it is related to other issues and what I mean by it but please describe in your own words this image and what insight you feel it gives to the human body and maybe describe to me some of the visual qualities of this image?

MTA *Well first of all I mean I start wondering whether I would have known what it was about if it was really ?? I didn't know what that this was from the start, that would have been it and of course knowing what it is I have to sort of pre-empt a bit with the description, but as a description I would say yes ?? a close up of the human vessel because I know that that is it, if I didn't know I could have come up with something completely ?? again as a speculative kind of ?? so yes I can see a human vessel and it is close up of a human vessel that is for sure. It doesn't or deminish to any of the other images that I have seen already it simply ??*

J *And do you feel that it has enhanced or diluted the original data that it was derived from in any sense?*

MTA *Well in technical terms, in the way that it seems that it is a close up, it is close up so this sort of thing always enhance, I mean the whole point is to enhance the image and you do have a close up of the image so that gives us more in depth knowledge of the particular bit, but it is only a very selective bit of course of the whole ?? so in that respect it to me you can use it for your own purposes it doesn't change, if you talk about aesthetic value of the picture from which this was taken from, it does ?? that you can do the close up but it doesn't change, alter the aesthetic value of the original picture at all.*

J *Do you think there is any visual qualities that this has, does it have any sort of visual language that you can see which is different from the other stuff?*

MTA *From the previous images that were on the screen?*

J *Yeh*

MTA *Not particularly, I would say, they were very similar in many ways, the style of the imagery and this images that went on on this particular screen there, they were kind of similar, kind of a genius actually*

J *And I guess again this is again you feel has a integrity or do you feel it has no integrity, or authenticity in that sense?*

MTA *Well authenticity in respect to where it came from, we know it is ?? it came from that particular image and we know that it is a bit and you can ascertain for sure that it is a bit of a human vessel, and in that respect one if you use the integrity concept in this context it has got integrity in that respect.*

J *I suppose baring in mind, do you think that the only information that is extracted from the data is the shape, that the only thing it has achieved from working with the scan data is that you gain the shape, so everything else is reconstructed*

MTA *Is a reconstruction, yeh*

J *Or as an interpretation because obviously these vessels don't have all these other attributes so it is, maybe what I'm trying to do is tease out how these various interventions that I had*

MTA *This is an interesting, for your own research I suppose, one could ask whether it could be relevant for your work to go and actually see how everything looks like and the real thing, through the MRI scan, would that have any baring on your own artistically representation*

J *I mean it is something that I have seen but to be honest there is not much to see if you now what I mean, it is a bit like a car crash really it is a bit blood and guts and gore and it is almost like a saturation of information rather than any type of great value*

MTA *That is the problem with the original sometimes, there is a saturation rather than from the original*

J *I think that is probably it. I'm going to jump Anna to another set of images. This is the kidney and I want to just show you a couple of different kidney images, now this again, straight ahead of you is an MRI image of the kidney, I'll just give you a background, this is again an MRI scan, a magnetic resonance image scan from Ninewells hospital in Dundee, there are cross sectional images taken from renal angiography which involves injecting a contrast agent into the patient and then the scan is run to highlight the vessels that feeds from the heart down the chest into the kidneys and further down and it is performed in the diagnosis of a condition called renal artery stenosis which is a very serious condition that occurs when the vessels that feed the kidneys become blocked or narrowed due to a build up of arterial plaque and this may result in a surgical intervention by the clinician, the image on the left however, is a close up of one of these kidneys from the scan that has been obviously, some of the data has been progressed to develop to shape and then an addition of lighting, texturing, some degree of transparency has been added to this data, so then allow you navigation of some of the structures and the shape and the form and Anna just based on the questions I have already asked you from the previous image, I would like to ask you the same thing again, in a sense, in what insight do you feel each set of images provide into the human body and how would you describe the visual qualities of each of these?*

MTA *In this case it is really easy to relate it to the original in this case because you have a recognisable image in the shape of the kidney and it is quite recognisable and of course there you have the senior image of the kidneys so that is easy and very straightforward type of relation which is apparent for sure and makes a difference with the previous image, there is a similarity with the previous image in terms of the, yeh it is very interesting ?? thing with the colours and ?? and it is very similar but I guess again is due to the technique that was used as a beginning.*

J *Do you feel that the interpretive image that I have produced has a*

MTA *the question about integrity, well in this case it is easier to sort of, if you keep on reasoning as far as the integrity concept goes in terms of faithfulness to the original and in terms of authenticity again, in this particular case it is easier to add that to the original one, yes it is a kind of, it has got some integrity in that respect.*

J *And do you feel it has been enhanced or diluted?*

MTA *I wouldn't say enhanced, again we are talking enhanced means to ?? to get it better not it is a value judgement which it must be based on what, I mean that is completely two different context so that context of the image works perfectly well for the purpose for which it is contracted, I mean for the surgeons whoever or the consultant who is going to look at it, I mean this other image, it is an image that has been created for a completely different purpose which is not exactly medical, not necessarily for this medical purpose so the question in my judgement, it is always feeling to the purpose that the image is to perform and the context so I would say that the question doesn't really stand in that respect and the question ?? that we have to ask at the ?? it doesn't really stand in this particular case really if you see to my point*

J *Absolutely this is the kind of response that I want, in some ways obviously what I'm trying to establish in this case is whether it is even worth linking to the original data when interpretation, is there a point to the linking the original data to the, if there is a degree of*

MTA *There is a point*

J *Or is it linked to context?*

MTA *Well that is the thing, for me personally for my ??? what I write I would say context is more important and then the other hand I mean in terms of the, again there is an element of technique here, the technicality of producing the images which one could say, I mean this is very sophisticated type of technique in which enhanced the image because it makes it better, not necessarily I would say aesthetically, I mean that may not be the right word but from a technical point of view and no one could argue that it is enhanced but for me it is a really the context that makes the difference and when it comes to that the question I wouldn't understand any more*

J *I want to put another image up which is the same piece of data that I've interpreted in a different way, so it is taken from this, well they are all borne from the same original starting point which was this scan and I just want to ask you to sort of navigate round this one and maybe describe to me what insight it offers into the human body and then the visual qualities*

MTA *This comes from exactly the same data?*

J *Yeh but obviously it has adopted a very different process of lighting, it has been very different influences to the work*

MTA *Well the outcome ??? this is an image that conveys ideas of the decay, death or whatever and even more so than the others if you like because of the shape and the colour and this white like sort of skeleton type of image connection there so visually it is an image which again you are not going to pessimistically ??? this sort of ideas so yeh*

J *And in terms of integrity, we talked, we are using words like decay, death, I mean words that I would use to describe this is fragility and a calmness that some of the other images don't have tend to be saturated so in some ways*

again this will boil down to context but the integrity of this, do you feel it has changed and it works by a different set of rules

MTA *No, no because that doesn't depend upon necessarily on context first, I mean it doesn't make any difference between this one or the other, also in terms of the fragility, whether it is fragile I would say that the other one for me also looks a certain fragile type of thing it is just a simple picture of the organ there on its own and it is also conveying images of fragility as well so it would not be too different, for this one I said it is mostly a question of the colour as well and it is over baring this white on this thing*

J *I mean going back to the scan image in terms of the authenticity that you describe, it is obviously very appropriate for the doctors to use as a process to diagnose so in a sense it is serving its purpose so it has a certain degree of integrity and authenticity but do you think, I mean in terms of its authenticity and particularly when reflecting something closer to a truth or a reality because it is embedded in the science because it is reproducible as a reproducibility in life and death that are made from these set of images does it carry more weight?*

MTA *No it is not a question that is carries necessarily more weight because the scientific environment, it is the environment in which that question of integrity would be more relevant whereas if you were in an artistic environment the question of authenticity or integrity in that respect it becomes irrelevant, now the question maybe for your project is whether you want to stick to this question of authenticity or integrity or how much that is relevant to this representation so that has obviously answered your point in asking the questions, I mean from my personal take, is that it is not, because with any artistic representation it is not necessarily relevant, there are some artists that have a very clear agenda and where the agenda is to be ?? come out very clearly but I mean is this appropriate is this the artistic statement here, yes I want to be faithful and is this an image which reflects and integrity to that*

J *But being faithful*

MTA *Once you more from one to the other the fact here that also we are working with two screens symbolic of the fact that we are in two completely linears*

J *But as an artist who kind of works between art and the science in the sense that there is having a kind of clear ?? in scientific data and the context of presenting to patients does become an issue, because obviously you don't want to misrepresent information*

MTA *Sure but that is why there is this*

J *Obviously you have to move the image and have a degree of interpretation like some of the images I have already shown you but do you get to the point where you decide you do not want to be tethered to the data and you want to say more than just communicating and you move the image or the interpretation beyond what you initially set out to do which was to communicate disease process for instance and the parameters that you were given to that were governed by a kind of ethical consciousness that you can't misinform, it is so interpretive of the image that it becomes unrecognisable but then whey you move it down to a gallery context that is*

the very point you move it away and you become very distant but as you go through that process or that band width or that translation process you remove it from

MTA *The medical and it becomes*

J *It moves so then does its integrity, authenticity, does its value set, the way it is judged obviously changes*

MTA *It changes, it necessarily changes it becomes more convoluted and less relevant than in the medical context*

J *What is interesting is that when you speak tot he medics is that is an interpretation to them as well*

MTA *Yes of course, that is our take and then also the way we were brought up, I mean in seeing the two things, the two cultures always of course and in a sort of binary oppositions where we are more into the science of course we would actually say that there isn't such a thing as an object completely object to the scientific and representation, it is still down to interpretation, I mean what you are doing is critical in your position and we are just putting up the contrast for digi purposes and I was just about to say that was an image that was going to be interpreted by somebody but we are trying to revert tot he fact that that was an image which could end up in a gallery and it has got completely different context and so some things will become together*

J *But the actual machine itself is an interpretation, the machine is actually interpreting proton densities so it is not actually a kind of absolute truth in that sense it is actually, which I find quite interesting as well, it is the machines interpretation based on its instrumentation and the machine is driven by a crafts person, a bit like a photographer, the lens provides*

MTA *In the ways that it moves on the body and it will come up with a particular images instead of another, or a different type of angle or whatever, this is a very good point actually the machine interprets as well, as well as you produced it is from a machine the other one you have artistically made just being produced by a machine which has made a contribution, contributed to it, so it is very arbitrary to come up with a distinction and some of the ?? is really the ethical aspects of the medical, the more that you have to be accurate enough because you are talking in a, you are in a context of ?? and that could be important whereas in the other one is it not.*

J *It is interesting though that the perception of the patients often is that the machine is absolute, the science provides and answer but in actual fact it is not it is the only difference is that it is reproducible under a set parameters so it never. So we are going to move onto something else.*

MTA *Well it is as close as we can add to reproducibility isn't it.*

J *Not this is a CT image, this time, it is another, CT uses x-rays instead of magnetic resonance imaging and the x-rays go through the tissue and they absorbed at different rates so you get a different type of visual image that tells you different things sot hey do CTs for different reasons and this is a, I'll tell you exactly what this is, this is an image or a CT of the abdominal area*

of the body and it is done on the aorta which is the main blood vessel in the centre of your chest and these are diagnostic images to look for a condition called an abdominal aortic anuerism which is a kind of fairly life threatening disease at the bottom of your aorta, your groin area where you arteries split. This imager here is the same piece of data that has been reinterpreted but it has had a degree of, it is the first stage of interpretation for me there has been no smoothing on it there has been no texture and lighting no different camera moves, no lens attached it is just pure perspective there is not even perspective on it, it is orthographic so

MTA *Why would you do it this way, why not go with the same as the other ones?*

J *I just want to, it is the first, it is before it has been interpreted in any sense there has been no doctoring of the information for the scan so it is actually the purest way you can build 3D from the scan, so what I wanted to do was to just discuss a little bit about what insight this provides over this image and the visual qualities of both these images ?*

MTA *I mean starting from the same, ?? it is a similar starting point with the other one I'm not sure I would guessed if you wouldn't have described to me what was the scientific image about because one lacks a certain knowledge whereas in the other one the artistic representation more easily worked out obviously the corporal, the body like and sort of located in the body so in that respect that images is more helpful than the original in giving a lay observers and sort of reference point where it is, I mean the other one could have been the brain or whatever so yes in that respect, that is an image in which you think of sort of early 17th century type, although it is very accurate and very modern but it is also sort of reminds me of all the representations ?? of the body, the insight to the body for example, the shape, the style, generally the style of the images just it is a more accurate yes compared to the other ones*

J *It is more accurate okay, and these are other different perspectives using the same piece of data but obviously*

MTA *But here is different, here we come to a little more similar to the other ones than before*

J *We have changed the background to black*

MTA *Yes it makes quite a difference yes.*

J *I think a lot of it is to do with it has got an additional context which is this, this is the bone which gives it placement*

MTA *Yes the first thing, it is a little more clear than this one than the first yes*

J *Also probably the bones gives some degree of connotations, historical connotations tot he anatomy*

MTA *Yes exactly, it gives that sort of, that is why the early presentations of anatomical representations of the bones*

J *Okay Anna, I'm going to jump to some moving imagery now and we are just going to talk a little bit about, these have been developed in a different way*

and they have got a different style and I just want to sort of ask a few questions orientated round that. Now these are some moving images here, the one straight ahead of you is an MRI scan that was done and it is a cross section of slices of the heart pumping on this screen here

MTA *Fascinating whatever*

J *This is a pumping heart and this was done through a kind of fairly advanced imaging process to capture the heart and it is supposed to be in real time but what actually it is, is the heart, because the heart moves so quickly the scanner cannot keep up so it isn't actually a reflection of reality*

MTA *The machine cannot keep up with us?*

J *No it can't take this level of cross sectional image quick enough so what it does is it takes one image on every heart cycle and then it knocks it out by one cycle, so over 20 seconds it acquires each slice so you end up with this so this is like somebody's heart pumping over 20 seconds although it looks like a one second pump which I find really odd but the clinicians think this is fantastic*

MTA *You would be dead if it was like that for real (laughs) so much for scientific*

J *But you can see the flaps of the valves opening, see them flapping and I find it quite hypnotic actually that*

MTA *There is a kind of like ??? sort of thing, I see this ???*

J *Like an ultrasound image. The image here on the left is different from the other ones in the sense that is have not got any central point of data, the red blood cells and the pumping motion has been inspired by this but not directly copied, I have eye balled it, I've used my kind of feel for the animation and then driven the animation in this myself in my own practice to match this, well not match this but to give the essence of this and then the tube itself it taken from the kidney scan that you saw earlier so that is real data and then obviously the red blood cells are not real they are oversized, they are very bright, they don't reflect reality but what they do do is they extenuate the narratives that I'm trying to get across with this*

MTA *This definitely more a sort of artistic reproduction, representation and as you said you were inspired by like in some cases when in some novels or films they are written are inspired by, there is something that gives the hint for the story to begin for the narrative to develop but that it is, there is only one little episode and then the whole goes on and this is the sort of thing you are doing in here*

J *So the question is Anna without repeating myself but what insight do you feel each of these images provide you into the human body and what would you describe as visual qualities*

MTA *I wouldn't look at that one to get an insight into the human body that is for sure, I would look at that as well as an artistic representation inspired by something anatomical which could be in this case a particular part of the body or not but really I would look at it for what it is, a piece of art which uses a particular technique, the red cells are, the way that the red cells are it*

actually makes it more, how do you put it, it is not that the trivialise the image, don't get me wrong but they just seem to make a little bit more lets say not popular accessible, you could get this into a gallery and you would have for example, if a child would come in, he would look at that and maybe smile because of the shape could remind him of toffee or something, I mean the way that they are and the way they move it could be really something like that, and the other hand it has definitely got some aesthetics to it

J *Going back to again and I'm repeating myself this issue of what is authenticity because I've used a kind of magpie approach, I've gather bits of information from lots of different sources and in some ways it is very much an interpretive process it is more akin to how an artist would work rather than how a scientist would work does it move its integrity and its authenticity into more of an arts domain or is it still on the edge or is it moving towards*

MTA *I think you would be on more stable ground if you would definitely move and use the question of integrity within the context of an artistic domain and be aware what the connotation that that has got in that domain, of course being aware as well as you said yourself earlier that the fact that it is in a scientific domain there is an element of interpretation and of course not perfectly reproducibility if you like and knowing all that but these images are definitely, this could also be some sort of a climax from the previous one to get this one, how far can you get from whatever it was that was that inspired it whatever you want to call it original and would always ?? but this could really be the culmination of how far you can get from that starting point*

J *Anna I've got two more images to show you and then we will have a quick chat at the end of this, I mean in some ways all these images are inter linked, everything you have seen today has come from similar sources, if not the one source, it is almost like there is a lineage with this work there is a link, there is a tree where you can branch all this work from*

MTA *All one source of the human body*

J *Yeh exactly and even some and I would say about 90% of these images are from the one body from the one individual, and they are all from this vascular system which is the system that pumps blood which is basically, if we didn't have it we would die because the body is just a collection or organs, it is collection of organs and almost I like to call it tides, eco systems, oceans, lakes, lochs, it has as much complexity as we seen in our own ecological system, it has a micro ecological system and it is almost like I see it as like global warming, if you pump lots of stuff into the system you are going to take the consequences of hurricanes and it is a bit like smoking, it formulates a similar thing, and it is almost I feel up to the artist to try and expose some of this through the aesthetic, expose some of these issues, as you delve deeper into this space, you start to see these synergy's with the real world and you start to build it into your own work, you start to build, I mean this particular image here I'm going to show you is a scan of an aorta looking from above, from the chest and it is one slice but it could equally be a satellite image taken of the Amazon river, so why did I pick that out and it is almost like I'm trying to attach some other kind of language to this, a kind of language of visualisation that exists elsewhere in some other fields, but anyway I just wanted to ask you Anna, this image and there is another I will show you on top of this and that is it, just in terms of the visual quality of this one, this is a still from the previous animation and how does it*

compare to this, it is probably not fair to make comparisons between these two images

MTA *No definitely not, for what we said already before, is why can we make a comparison from that to the one before just because this is a still image or whatever which makes the focus more on a particular detail of the ?? of the picture ??? completely ?? from the different connotations and makes me thinks of any ??? but there is no relation whatsoever and of course when it is clear because you used it, you used it and you know that that is the one thing but in terms of the ?? that is completely irrelevant*

J *This is another image as well which has a degree of, it is again the kidney data that has come from the same patients and it has been reinterpreted in a different way and I've added much, it is heavily augmented in the sense that it has a high degree of intensive light and intensive lighting, you have like the kind of vessel full of red blood cells and it shows the narrowing but it is a very heavy saturated image and you can obviously see influences from various other places*

MTA *It is a beautiful image, if you want ??? about the aesthetic quality per say of this image are regard to this, this is a, you can ?? very beautiful images, they come across as a beautiful image and that definitely appears an aesthetic sense to it which is the light and the colour and the background and in that respect they are very successful images when it comes to the artistry*

J *Do you think that some of these images are and I'm kind of harping back to this authenticity but they harp back to a time when we were exploring the body, there was an awe about our internal space and public dissection*

MTA *Well we have seen exploring of the body, the body is very much part of our research and what is important and it is not so much, it is important in ways but it is inside the body that inspires this kind of research but also using the body and the interface with the machine so the whole concept of the science of the machine which is an old concept in this process of ???? really the classics, it is still very much part, so we are still unfinished with our bodies, regarding what people like Stallac says which we leave the flesh behind, I mean the flesh and inside is still an immense source of for interpretation, for artistic ?? or whatever so I think that project could well fit into this idea of the relevance still of the body for artistic purposes, for investigation of many types, artistic investigation, nothing to do or related in this case to scientific investigation, the relationship between the two has definitely the relevance still of the body, that is for sure, not to forget it, it is to*

J *Great Anna, that has been really useful and what we are going to do it we are going to have a seat and we will have a quick chat about some of the issues that we have talked about. I just want to talk to you a little bit about, I've got four questions to ask you but before we do that I want to talk a little bit about the origins of the work and the processes, I mean I think in some ways the origins of the work is less of a problem for you as obviously you work in the arts and you know in some ways what goes into producing an image and this is very much about the scientists that come down and I do the same thing with, to give them a fell of how the process of building imagery like this, it isn't a push button process, it is not a linear process of stages, it is a matrix of processes and they can change depending on the*

subject matter and I just wanted to show you on this table that these are the influences that affect the way I produce work, yeh Andrea Versallis and Rhembrandt, I mean there is historical influences, there is obviously images particularly in lighting, I mean CG lighting it can be often quite naïve and the sophistication of traditional media where they have a history of dealing with complex lighting situations to tell a different stories that is something CG can learn from particularly working in this contemporary media and I feel an adds a kind of air of sensitivity to the work and I think when you are dealing with sensitive issues you are trying to probe further than just purely the shape of the anatomy within the body, but other things that go on in the process is, there is a process of mediation that goes on between medical staff, they send me emails and we do drawing together, there is this constant back and forwards, this planning and attacking it, it is like an action research model very much and then there is obviously more kind of this sort of thing which is the natural world influences what I do but obviously the celestial influences and the visual language and vocabulary

MTA *The classic is the correspondence between the human body and celestial one and the work of nature*

J *So it is nothing new what I'm doing, in some ways it is like, I mean I may be working with contemporary media but it is dealing with a various*

MTA *But that is the way, it doesn't exist out of the*

J *Although some times you might think it does because we are constantly, every generation seems to think it is doing something new but effectively it is probably just*

MTA *It is a little step, although it doesn't necessarily mean that there is a linear but it is a step*

J *I mean these are some other things that I just use a props and it is probably less relevant to the discussion, discussion as we have have a good grasp of what I've been talking about and what I'm maybe trying to achieve with some of the work but I mean these types of images have been produced recently have been completely interpretive in the sense that they don't stem from medical data this is actually, I purely sculpted this to see if I could do it and I added the movement myself based on my own judgement*

MTA *??? you fooled into thinking that it is an anatomical piece but it is*

J *But what happens with that is people buy into that because it is almost like you feel that you have got an issue with integrity, conscious that as an artist you should be telling me how you are making the stuff because they are taking it as reality*

MTA *No, no you should because that is where the context comes in where are they going to look and be aware of the context and that is ??????? not for the artist necessarily to tell ???*

J *Okay, there was one other thing I was going to show you and it is this but it is something that makes me laugh but this is an image that I took when we went to New York last year of a mammoth*

MTA *Like mammoth yeh*

J *This kind of natural curve and form and these images that exist in nature and the symmetry which really inspired me to produce this image here and I think what it told me was that I am constantly as an artist looking for structure and symmetry and harmony in the data that I've been given, the human, data because a lot of it isn't linked, a lot of it isn't*

MTA *It is necessarily going to be accurate for working in this area, I mean some artists it is not appropriate to ?? you could achieve and aesthetic ?? that could be achieved even without considering ?? maybe in the context that you are working that doesn't matter either ????*

J *They maybe have an affect on each other, they probably affect each other they probably seep into one another*

MTA *Sure ????? a resource if that is the case ???*

J *Because you are working in the context*

MTA *Yeh there isn't such a thing as a detached ??? so that ???*

J *Shall we grab a quick seat Anna and I'll ask you these last few questions and that is it and then you can go home. The kind of first question is do these images affect the way you think about your body, the images that you have seen today?*

MTA *No not particularly, I would have to say, I mean the perception and the way I think about my body is not necessarily is affected by this although I would say that if I would be engaged with this project for the whole length of a PhD I might be*

J *Yeh I can see vessels in the street*

MTA *So that is not enough then, this session hasn't been enough to do that now.*

J *The second question I have is and it is a sort of open ended question, you sort of, I've asked you already and it is how would you define visual integrity or authenticity in your own practice, what would be your, or is it just a moving target that you can never really pin down?*

MTA *That is difficult, I mean for me I'm not active practising artist so in that sense I am not a producer of the images in that respect, I can be in a sort of privileged situation if you like of having to engage with images not produced by me but produced by somebody else and I'm in the freedom of contextualising such images and used them for different purposed and I can think relevant for either ?? uses research uses, so in that respect the question of visual integrity for me it is out of focus in respect of what you were asking before in the original and the reproduction and that sort of thing for me it is like a different, so it comes down to practical element of my practice in the sort of images that I use for teaching, for research and make sure in that sense there is an element which is aesthetically important and make sure that there are images which are first of all relevant, the importance of working with the right image for the right purpose I mean these sort of issues but they are completely different from your context I*

would say.

J *But do you think things like objectivity and em*

MTA *Objectivity you are talking to somebody who is a kind of a post modernist in a post structuralism type of thing and being embedded in this sort of thinking now for quite a while so such concepts as true objectivity has almost become a trivial thing to say that we look at them in a more cynical way nowadays so hence the observation we were making before by the science as well, science as well is embedded in this culture, it has always been but now more than ever maybe and its awareness so there again from an artistic aesthetic point of view such concepts are highly arbitrary in many ways so*

J *A question that I've probably asked you before but what role do you feel an artist should play when working with medical scan data?*

MTA *I don't know what role, and if role is the right word actually*

J *Well kind of words that have come up before and I'm saying these are right or wrong is translator, mediator, illustrator*

MTA *Well it is all of that and more in many ways because I would prefer the last of the images, I mean the last of the images was crucial for me the one that you showed over there and you said it was used, the scientific image as a starting point and then you went on to do something else with it and then in a way it shows a sense of really more artistic maturity if you like than the previous one because in the previous one again the comparison, the element of what is in English a very ?? the element of being the likeness of something to be regional was easier to support when that sort of becomes more ?? that is what is the parallel to ??? they are to me anyway for mine personally that is where the aesthetic value for me increase but it is my take on it so one could dispute this and say exactly the opposite*

J *So you could say it is mediation process but it is also a blending process of practices?*

MTA *It is blending process of practices but it is not necessarily important the quantitative element of being used, you start with some data, it can be a lot of data that is or not but it doesn't make it necessarily more successful, artistically presentation that is my point*

J *And again I suppose it all boils down to the mechanism of dissemination and the context?*

MTA *Yes the fruition or whatever it is that you produce to where it is going to be acceptable, who is going to look at it and the context so yes crucial things for any*

J *I think the struggle I suppose because I'm flicking between an intermit dissemination to a patient potentially and to a broader issue of a deeper kind of respect and understanding of the internal body space, is based on my own reflections and my experience and it is constantly sort of intermit versus a kind of broader input and obviously when you deal with intermit it is a bit like a feature film in a TV commercial, you have commercial, it is very small*

compact way of presenting with a high degree of scientific integrity versus a much broader

MTA *Yeh but then again it is the purpose of the of the thing, whether you were commissioned for example to have such techniques I mean to produce such animation to use on a medical class were for a lecture obviously in turn that context, I mean you work should be more obviously more focused on as much of the particular other elements of the integrity aspect of it and so forth, maybe it is worth keeping this open, the possibilities and*

J *They feed one another though, I mean the ability to experiment and try something new because aesthetic language isn't just kind of wholly honed by us, the gallery space is not the only place to show, it can kind of cross fertilise and if you kind of develop something slightly off the wall there is aspects of it that can be actually embedded in much more efficient ways of communicating with patients, a way you never thought before to try or to do that they may have kind of cross fertilisations although they are slightly polarised because they have different objectives and there different constraints on the two although there is very little constraints on maybe the end where I just want a general kind of free for all.*

MTA *Well okay I hope I have been of some use and my take I guess is it is a very I mean it is my background compared to most of the people who work in the college is slightly different to my take on some of the these things could be*

J *No Anna it has been useful every opinion is of value because it allows me to build a picture of what it is I do and*

MTA *It is a very clever things to do anyway and I overall I think I enjoyed it I would have enjoyed it I mean today I thought I would be made to look at CT scans but it made me think of them in different ways which was*

J *It will probably take a while, I know when they do this scan they take a while to feed back to you.*

2.10. Sculptor A

Interview with Sculptor A
Date: 19/10/06
Time: 09:30
Duration: 1:15:43

J *The way that I have split this up on one side I'm going to display some of the scientific data that has been collected as part of the project and on this side I'm going to display some of the 3D visualisation to I'm going to have images up simultaneously to discuss rather than sort of independently move through the work and I'll give you a few seconds to reflect and I'll also give you some context to what you are looking at as well, so I'll start with this*

SCA *Remind me what MRI stand for*

J *It is magnetic resonance imaging and I'll give you some background to this before we start but basically this image straight ahead of you it taken from a magnetic resonance image scan and what the MRI does it kind of measures proton density in tissues and you have probably seen it in the news you get loaded onto table and they take you into this sort of plastic cocoon and you are in it for probably about 45 minutes and this giant magnet runs these sequences and it almost chops you up digitally, effectively and this particular image is an MRI scan which was done in Dundee and it has highlighted the arteries feed the brain with blood and oxygen so you can probably make out basic anatomy from that but it is not an animation in any sense it is sort of one moment in time and it is a cross section of slices from your front to you back, the image on the left here is slightly different this is a three dimensional reconstruction of that same piece of information that same piece of data and it has been used to inform the reconstruction of this but obviously there is a fair degree of interpretation in this because digital lighting has been added and its colour and in some degree there has been texture added on the geometry and these sequences panning round the object so the object is not moving it is just looping on a ten second loop*

SCA *So is that your arteries?*

J *Yes, it is the arteries taken from this piece of information here, the are called the vertrebal arteries these are the arteries that go up you back past your spine and into your brain from the back*

SCA *There doesn't seem to much visual information here for an reproduction of ??*

J *Yeh you are right basically the only information that this provides is the shapes and don't provide much else it provides the geometry and basically the outline to the tubes or the vessels is all you can really extract from this information and the rest has been added in a sort of*

interpreted process. I have got some specific questions but as I said feel free to add you own if you want Gary but the first question, well there are two questions really and they are linked is what insight do you feel each of these images offer in to the human body and how would you describe the visual qualities of each one of these images?

SCA *Well it is very fluid and it is motion, I mean you talk about slices through the body and ultimately it is far more complex and I can delineate the fact that it is a head and neck and shoulders and the actual light spots and I would image the light spots were ?? more than anything else, I mean the one on the left is obviously a great sculpture and it is the opposite of the one on the right and it actually gives you a sense of real through the nature of form, you could be looking at tress you could be looking at root structure and it does give you a sense of three dimensions albeit the one on the left ?? but in a way it looks slightly more war wound because it is actually flesh like and I think there is a slightly more rude quality to it which I'm not sure really that would automatically, or if it would matter too much with the idea of being sort of flesh or whatever base. I think the one on the right is obviously quite interesting and it reminds me also of Mark Boyle's investigation of light and liquid from back in the late 60s early 70s I don't know if you know Mark Boyle?*

J *No I don't no*

SCA *Well Mark Boyle, there was a family called Boyle artists and the Boyle family who Mark Boyle died recently but he worked with his family, his sons and his wife and used to travel the world and make casts of various parts of the world going through a darken map and he would go to that place and make an accurate cast of it in a way you can ?? and that work started from him doing light shows, psychedelic light shows in the 60s and this reminds me very much of that watching liquids and light and it is just interesting.*

J *I mean it has got a sort of visual quality of its own*

SCA *Well it has a kind of slight psychedelic quality to it and it is quite enhanced but it is difficult to read from my point of view in the three dimensions, I mean that is why they are totally opposite*

J *Yeh they are almost like extremism on another and I've got a linked question to this is how you feel the image on the left, do you feel it has less or more integrity in the sense that it has a degree of interpretation, does its integrity change because it has moved from the scientific data or does it remove the authenticity*

SCA *Well this is relevant to what information a person would have, if you are talking to me in terms of knowing that I have a fixed amount of information about what this is em well I guess the main difference is that although I find this more complex, more abstract if you like and more difficult to understand I do get the sensation from what I know and what I perceive there is some degree of perhaps something real that has been gained through some sort of imaging process but I think it is quite evident to me that this is a model albeit a quite complex model and that fact that is has been articulated and a rotation I think it*

does suggest to me that the person that built it really wants you to get to grips with three dimensionally and the fact that it is actually, yes it is a three dimensional form it actually exists within someone

J *And do you think the relationship between these two do you think one has become and enhancement or a dilution of the other or do you think it is, I suppose it depends on the context and perspective that you are looking at.*

SCA *But I'm only getting, I'm only understanding of these two are linked because you were telling me that, I mean the is no visual between the two in my mind, if I look at the one on the left and it is a really structured complex root tree form type thing, I mean you don't get that with the one on the right at all the one on the right is melting and merging and it is fluid and there is no structure it is actually all liquid and it has that slightly psychedelic quality that I referred to earlier the only delineation I get is when suddenly the head and neck and the shoulders form part of the body, but I mean in actual fact looking at these two images cold I would find it very difficult to make a connection.*

J *I'm going to slow things down a bit and I'm going to put up some statics and it is the same sequence it is just I've taken some snapshot from but there has been a degree, I mean the images in the terms of the 3D visualisation there has been some addition interpretation on my part and some focusing on particular parts of the form and I'm going to scroll through these and then I'm going to stop on one particular image and we will chat about that one image so I will just scroll through these and I'll give you a few seconds for each one and then we will stop on one particular one and they are almost like a collection based on the same set of images, the same piece of data, so I'm going to stop it on this next image here and maybe I can just ask you to describe both these issues of what insight you feel it gives to the human body space and some of the visual qualities of this particular image in terms of its form, structure*

SCA *Well you are clearly looking at something organic that actually grows and I think that comes across very strongly, you are talking about broad canals that go to the brain and how they are extended almost tree like forms so it is something that is actually organic and actually grows and I think also the issue of focus that comes we are not looking at something which is graphic it is not an illustration, it is not a two dimensional graphic rendering there is actually something that exists in the real space.*

J *Do you think is it has got again I suppose because its qualities changes slightly from the initial do you think that its integrity has increased in some sense or changed its authenticity in that respect?*

SCA *Well we are looking, I suppose what we are looking at here is a segment of something and segmenting something does have connotations it starts to make you question what the whole it like and I suppose also the question of what you are doing in the second image and does it focus on a particular area of investigation or are you actually trying to somewhat confuse the whole issue because*

sometime by segmenting and going into detail you create kinds of abstract which sometimes can be intentional and sometimes are you doing for more obscure purposes, I suppose with an image like the one you have got on the front here there is a kind of close up segmental quality in difference of focus does start to drift to artistic aesthetic kind of resonance as opposed to what you might call a more graphic illustrative medical reference and of course it makes you think about all sorts of other things it makes me think about alien culture it makes me think about the baroque and the Chinese nation

J *I suppose the next question is do you feel it is adding these additional area of focus and drawing you attention as you say in segments do you think that gives a degree of enhancement or do you think that give a degree of dilution to the structure? Or is it not a fair questions*

SCA *Well it is all linked to what information you have prior to viewing that image or on the side of that image and I guess this ?? to what degree there is a conceptual thinking behind it, it could be articulated in a story board and it is a work of art, a lot of ?? artists these days actually go to and talk quite specifically about concept and concept, I mean the work can not be enjoyed without the actual concept in mind, what you are showing me here is, I mean I have prior information and it is medical but without that prior information I couldn't be honest and say it is entirely from an aesthetic point of view and I'm probably thinking along biological, I think there is a strong sense of growth which is ?? and I also think of liquid but I think once you start merging and softening focus you could also be talking about these forms existing in some kind of liquid or atmospheric container. I don't know if that answers your question*

J *it does, now additional information and we are almost working our way down the body and we are going to move onto some kidney structures and I'll give you some context of these images, the image straight ahead of you on this screen here again is an magnetic resonance image, it is two dimensional slices through the body on the sort of abdominal chest area and these are again are images from front to back and this scan was taken in a diagnosis of a vascular condition a heart condition called renal artery stenosis and this is a serious condition that occurs in the vessels that feed the kidneys and what happens is a blockage or a narrowing runs up into the kidneys of what they call arterial plaque and this may result in a surgical intervention so that is what that picture was taken for and I can actually stop in and show you and in this case as it scrolls through, on the right hand side there is pinch on one of the tubes and that is the reason they did this scan on this particular person so on the other side on this screen this is the, I've particularly focused in on the healthy kidney here on the left side and this is a reconstruction of that kidney, digital lighting has been added to pick up some of the form and shape of the object and digital transparency has also been added to it and it gives some insight into the structure of the organ and so again the formula of the questions are along a similar lines Gary how would you describe this image in terms of what insight it gives into the body and some of its visual qualities that you feel it has on both parts if you want to make comparisons please do*

SCA *Well certainly the image on the right it has a quite strong I guess the kidney shapes that kind of explode onto the screen and they are very recognisable and I guess the spinal chord down there*

J *Well that is actually the aorta, the big tube in your chest and it comes down with blood*

SCA *I mean with that information in mind it is quite fascinating but to a lay person of course you wouldn't being to understand what you were looking for that sort of pinch as you described it and I guess the people who read these images it is a complex game and something you do with great experience and professionalism but I mean what you have got on the left again is quite a beautiful thing actually, I mean I think what has been created there, and that is a kidney from here yes?*

J *Yeh it is the left kidney*

SCA *I mean certainly looking at the two together I can see that form has come from those seemingly kind of exploring around and arriving these appearing images and again with this one what you have definitely got is a sense of three dimensions it makes we think of Henry Moore it makes me think of straw actually as well, I think there is something about the way you lit the outer shell and it does tend to suggest straw but the one thing that comes across to me quite strongly and trying to understand what it is and I feel the movement in this is quite interesting and I think the movement in this gives us the suggestion that it is a real take on something it is almost like the thing is throbbing and I know that is probably just because the way the scan has been done, the one thing I feel probably the more I keep looking at the image on the left is, if there was some kind of movement in that image if there was some kind of flow through or activity it could be quite interesting, I feel that would be an interesting development to actually to develop the kinetic aspect of that but as images there is still a lot of distance between these two images in terms of the kind of imagery showing there but I don't know*

J *They are fairly polarised aren't they, the kind of extremes of, okay in terms of integrities I suppose to different audiences how do you feel each one has less or more integrity or just different types of it*

SCA *How are you using the word integrity what do you mean by the word integrity?*

J *I guess what I'm trying to say in terms of authenticity implying the image here taken from the scanner has a degree of scientific integrity as it is used to make decisions but however the image on the left has such a degree of interpretation it is removed from that scientific value and the scientific value becomes diminished because it is purely an interpretation and in doing so does it become less authentic because there is this degree*

SCA *Well these are interesting to debates because these debates about a portrait painting really isn't it I mean how real is a portrait painting and in some sense is it more real than someone's view of a person because everyone has a different kind of eye sight and they perceive*

people differently and people move in different lights they have different expressions so it is the same sort of debate that often goes on within the art world about representation, when Picasso and Braque were doing cubist works at the beginning of the nineteen hundreds and they were advocated what they were trying to do was to get under the skin and actually find the real expression within something and that whole debate about representation I guess started with to an extent in cubism and I think the interesting debate here is well okay we know that it is through a scientific process it is some kind of reading of what is going on but it is a reading that has been done through a scientific instrument so there is a level of scientific accuracy yes but it is not truthful in a fully visual sense

J *It is not an absolute truth, I mean it is quite interesting you should say that because some of the feedback we have been getting from some of the clinicians and physicists that work with this piece of equipment have said similar things that this is much as an interpretation of what is there and it some of the art space work that you have produced because ever y image is different and there is a degree of reproducibility because they have to work within parameters to try to keep the same image but everybody is different, every body is different and reacts differently to the machine*

SCA *I guess if you take the kidney out of the body then the kidney is instantly different so how do you picture the kidney supposedly in the body when you don't actually see it with your naked eye and this is the challenge somewhat through scientific instruments and you are doing it through scientific instruments to a certain extent, digital instruments but what you are doing is perhaps applying, it is imagination but it is imagination about what the real thing is so it is unusual I suppose to use imagination and reality and representation in the same sense but actually that is probably what is happening*

J *There is another image I want to put up Gary and it is the same piece of data it is the same kidney but I've interpreted it in a different way I've lit it very differently and I've textured it very differently and it is in a very different position to tell a different story I feel and I just maybe wanted to ask you what you felt about this particular image and what insight it offers and some of the visual qualities and integrities of that*

SCA *Well it is very different to the previous image because it suddenly doesn't actually look like, I mean the previous image there was a very very ? feeling that you were trying to get the people to accept that you are looking through something that was translucent you were trying to look through layers to actually see something through layers and you were allowing the eye to go into something which might otherwise be opaque, this is different in like it is more like a sculptural image this could be a bone, it is very like a piece of bone structure it give you no suggestion whatsoever what is inside it, I mean I suppose my imagination suggests that perhaps was hollow inside, the surface it does look like bone or it could be stone, I mean if you go to Auchmithie you will see rock structures almost identical to that so it has lost that kind of sort of mysterious translucence flesh kind of thing*

J *Do you think it has a degree of fragility?*

SCA *There is a dry fragility about it I think also my point of view the background, I mean looking at art work ?? and looking at photographs and images of sculpture it is very very what sculpters would do when a photographing small scale works who will of course use just a rolling sheet of paper and photograph it on that so you don't seen any horizon line or anything the image is this body but that actually looks to me that the fact you have got the grey background almost hightens the fact that it is a kind of it is a solid image that is being presented.*

J *I'm going to move on to some other piece, this is an anuerism*

SCA *Anuerism?*

J *So the image straight ahead of you is what is called a CT scan and this is of the abdominal area and it is particularly looking at the aorta which is this main tube and these are diagnostic images used to detect a condition called abdominal aortic anuerism and this is a life threatening condition that causes a bulge at the bottom of you aorta which is where it splits at your groin and it may involve an operation or medication but it can be quite life threatening and it is quite common in Scotland. This on the left hand side is a reconstruction of the same piece of information it is a basic reconstruction there has not been a high degree of interpretation so basic colouring has been added and a very basis orthographic view has been provided and maybe I'll ask again just to describe how these images offer some insight and how would you describe their visual qualities?*

SCA *Well it is actually quite spectacular actually, the one on the right, it is really quite spectacular I mean the kinetic movement is fascinating and the area on the outer side of this image there is a feeling on that you are actually moving through and actually travelling through the body, horizontally and I'm picking up bits of spine there?*

J *Yeh spine and that is the ribs and you go down the spinal column and that is the ribs*

SCA *So that is fascinating*

J *And then you go down and the top of the hips to the pelvis and then it is basically like there*

SCA *But that is literally travelling through whereas this is looking straight ahead em I mean this is a very, it is quite a flattering image actually and the graft behind it doesn't help that it has flattened the whole thing out and in a way the earlier images showed me where you started to talk about in and out of focus that has an in and out of focus quality all the time that has no in and out of focus it is very graphic and I guess there is not much feeling of a separation or distance if there is any between the rib and the actual bone structure and from my point of view I'm not whether that sits on top of the spine if it is fully three dimensional and is glued to the spine there is a bit of doubt there in my mind how that actually sits three dimensionally*

J *And do you think then obviously the CT image has kind of stronger*

integrity to it a stronger or do you think this enhancement of the 3D image that has been built from that or is it not a fair comparison?

SCA *I'm not seeing a relationship to be honest I mean, I think with the previous image of the kidneys you did see the form of the kidney fading and you couldn't relate it to the actual kidney that you form, it is difficult to see the comparison and I guess the vertebrate is the nearest thing, the vertebrate is the key thing that actually you can see the linkage but. So what is an anuerism, it is something to do with the bottom of the bowel or*

J *Basically if you follow the aorta down this is the main tube that comes out of your heart here so if you imagine your heart is on top of that it feeds down and this anuerism is a bulge, it shouldn't be that shape it should be the shape of the tube above but because of a build of arterial plaque ?? inside the aorta and on the walls there is calcification so if you smoke a lot and don't do any exercises this*

SCA *It is not connected to the bowel?*

J *No, this is almost like the main highway of blood going to your legs so it is highly pressurised to push it down but you can see the bowel on the actual outside, the bowels are here, the bowel is actually, the bowel sits here this black sort of area, so that is the ?? the bowel is here so the aorta is quite far away it is quite protected and is close to the ?? so it is in your body core so obviously if that get ruptured it is pretty much curtains so if you hear of anyone with abdominal aorta anuerism they get you in very quickly they pretty much think it is a 90% chance of fatality if it bursts unless you can get to Ninewells within 5 minutes, so that is highly unlikely. So I'll just jump to some other images here, these are just various views on that, what I'll do is I want to show you some final pieces of information Gary and these are just some moving images, moving animations of blood flow, moving through these vessels, these tubes in your body, so the image that you are looking at straight ahead on this screen is a heart, a cross section of a MRI done of a heart and this is across time this isn't slices panned through the body this is actually if you can imaging the patient has been sawn in half and opened up digitally*

SCA *This is real time?*

J *Yeh it is real time but it is not real time it is real time in a sense that it reflect the heart moving but because the heart pumps so rapidly the machine can't keep up so what it does is it takes time lapsed images and then pieces them together so you get over ten lapsed cycles that develops one so it does look like real time and in a sense it is real time but it is the real time built up from time lapse, this image here is a bit more complicated it is not actually, it is built from lots of pieces of information, these little red blood cells that have been added in and they are moving through the vessel have been inspired by this movement, they have been informed by it but they are not a translation of it in a medical sense, I've not fed data in it I have just eyeballed it so I've used this as an inspiration to build this flow, this tube here is the aorta and that was taken from a scan it was taken from one of the scan you saw earlier of the kidney and obviously the blood cells themselves*

are very fictitious they are interpreted because they are not that size but what I'm trying to do is give some sort of narrative here because it they were real size you would never see them and it would just be a solid liquid so in a sense this sequence differs from some of the rest that is it a collective process of inspiration and interpretation rather than just a direct translation or a translation with a degree of interpretation so maybe if I ask the same kind of questions of what insight each of these images offer and how you describe the visual qualities?

SCA *Well this one has definitely got that slight kind of kinetic thing that I wanted in the other one, I did feel in some of the other ones, I think the one of the kidney that some kind of movement or animated frame would liven the whole thing it looked as though it needed that and I really do enjoy the animation of this very very much, in many ways I love the kind of glass, almost, it looks like a glass tube I love the subtlety and the spatial quality of the actual tubes are there veins in this*

J *The are blood vessels they are not veins they are arteries and they are going away from the heart rather than going back to it*

SCA *I mean I think the quality is really sort of really nice, I think in a way the small red elements which are what?*

J *They are red blood cells, so they are the oxygenated cells*

SCA *In a way they are probably, they look like sweeties don't they, they are kind of almost balancing, the look hard I think that is the feeling I get from that image is they look hard they look as if they are actually bouncing off where I would have thought the feeling you would have wanted from that was something more soft and amoeba like and to my mind knowing what you are trying to do there it is probably, I mean it is a very beautiful image and it really does flow but I just feel the way these red images are bounding off the sides are something a bit too drab about it and it is not maybe got the right kind of dynamic, I mean it is more about to do with fluid dynamics*

J *Yeh and it is interesting you should say that as obviously the walls are very sponge like, they are very absorbent, there is*

SCA *That seems a lot better there is something more subtle there by the way that the forms are really pulsing through the tubes, I love the way they hit the middle and bounce off either side. I think in a way I just feel though that the red elements are just a little bit too graphic*

J *Maybe stylised too much?*

SCA *Yeh from my point of view but actually you know there is quite a correlation between these two things in particular the tonality here I think what you have got here in terms of the subtle greys and the white tones is actually linking up quite strongly to this you know and of course that kind of beauty, that kind of beauty is almost in this piece as well.*

J *The rhythm*

SCA *Yeh the rhythm*

J *It is interesting because that is something that really is fascinating that the body just isn't just a collection or organs that they have, they need blood to function, they almost need an eco system they always have tides and lakes and flow a bit like the real world*

SCA *The rhythm here is good the way it pulses through.*

J *I've got a couple of more images to show you Gary and then we will grab a seat for the last ten minutes or so and I just want to ask you a little bit about these two images, now this image straight ahead of you is an aorta it is again that same vessel, one cross sectional slice and then this one here is actually inside that vessel but with a high degree of stylisation*

SCA *Inside?*

J *How do you feel about the visual qualities and insight they offer, either of these images offer?*

SCA *It is difficult to make a link between the two quite categorically why would you and it is like saying this is a map of the ?? and it is like saying this is a piece of Earth, there is a link in a ways but you are coming from the two things very coldly where is the rationale come from*

J *Okay that is fine, there is one last images here that is a continuation of that previous image*

SCA *There is certainly a link there now*

J *Yeh this is the aorta and that is almost like the pinching that you saw in the previous scan that is the same piece of data*

SCA *That is a beautiful image, I mean it is a very strong link here I mean obviously the white tubes is replicated so you have got an immediate referencing, the difference here is that you are getting a sensation of something happening within that and you have got a sensation of flow as well and I really sense these red particles are flowing along something very very fluid*

J *Do you think it has a degree of integrity an enhancement in comparison to some of the other imagery both 3D and 2D images you have seen?*

SCA *Yeh I do*

J *Again this one again is one of the images that has been informed by lots of things*

SCA *I mean it is, I think it works for me because it is kind of, it is a beautiful image and it is kind of like a landscape in one sense and it could be a river, it could be looking at a part of the world with the moon above it, and I think the reason why, when it is, our body is a landscape right*

and I think that is why it starts to work for me because it has got that feeling of landscape which the inside of the body are in a sense and that has a landscape feel to it so there is a lot of correlation between those two images and yeh

J *Okay so that is the end of this part of the experiment over Gary and we are just going to grab a quick seat and discuss a couple more issues in the last few minutes. This is a sort of what we now describe the origins table but obviously these images are not just built on a translation basis there is a high degree of interpretation as you have seen in that last image and it comes from different sources and obviously I'm bringing in various aspects to this experiment and it used to contextualise what I do and the process of visualisation or interpretation of this medical stuff involves kind of various inputs which obviously they start with the obvious which is educating myself in the anatomical structures but as an artist you have got a degree, there is a degree of historical influence I'm not the first person to visualise the human body and in using those reference materials to try and inspire what I do is quite interesting because this is quite a good one from Andreas Veresallis and obviously at that time the visualisation of the human body was very much a aestheticised process I mean there is a grotto in the background but yet there is the kind of human fix to that and from our eyes it just seems why on earth have you brought those two things together but in his eyes that was very contemporary at the time to do that to bring those two, and then there is this Rembrandt image that is quite famous as well and obviously influences from the natural world that I have picked upon and things like influences from kind of more traditional media of painting but obviously these items have a slightly obvious direct translations but they really help inform the digital maker which can be quite clumsy when you are trying to reveal very sensitive emotions and I'm suing subtle lighting techniques and these sort of ?? straight along the back it is a very tiny piece of my process and then you have a degree of co-operation and interaction with the staff and patients and this involves, meetings, drawings and communication that goes on so in some ways this is your integrity and maybe the integrity is distanced from a scientific integrity but it brings a degree of aesthetic integrity because you deal with the complexity of the interpretation that goes into making some of the images*

SCA *I mean this issue of integrity is obviously quite big and I mean*

J *I mean how would you define integrity in your own practice Gary is it from a sculptural point of view when you evaluate and you gauge the relevance of a piece or a piece that you maybe be constructing itself, I know it is a very kind of large questions and it is probably not one to ask*

SCA *Well I mean it is a bloody huge question but yeh integrity because as an artist I guess integrity to you is you know you are actually, you are using artist licence if you like to try and recreate something which is not normally visual and I guess the integrity debate comes in with you, the integrity bit with you is to how much you use that artistic licence, is the artistic licence being used as a means to an end to actually tell a story and I guess that is integrity but I guess where the integrity goes slightly rye is if you were using your skills and knowledge to actually go down a*

track which is perhaps, I mean artistic people can go down all sorts of tracks which are self indulgent which are about appearance which are about instant impact and I think that is, I mean that is an issue for me all the time, because I work between reality and abstraction and it is very easy to create thing that are beautiful well relatively easy but it is whether things are beautiful but have something beyond that beauty that makes the whole process worthwhile so the word beauty I think is interesting to link up to that business of integrity because beauty can be quite a false thing but at the same time it is an important thing, I mean from the generation of artists that I come from beauty and aesthetic was always very important with a generation of artists of now say in their 20s and 30s it is less so to them the actual integrity of their concept is more important and if beauty arrives out of it accidentally fine but my generation beauty always had to be there you just had to be very careful how you used it, it was almost like you had to get a licence to use it, yeh integrity yeh when I go to art shows all over Britain or the World integrity is a big factor you can almost, you develop a way of reading things and you can actually read, if an artist has tried too hard, if there is too many external reference that is when the internal integrity breaks down, I think you become very good at spotting something which has a core integrity that you feel has come from that person and that person has the confidence to know when it is right and when, yeh, I don't know I'm sort of digressing

J *No that it is quite a comprehensive answer Gary, a question I had as well was what role do you feel artists should play when working with this sort of context that I work in dealing with medical data because I mean some people describe me as a translator, some people describe me as mediator some people describe me as an illustrator and I think I have varying degrees of being all of these but I don't think I'm any of those things, I don't know how you feel based on what you have seen today?*

SCA *Em, well I mean for any kind of artist or designer for that matter I mean you fluctuate between making and doing things purely because you like doing them you do them for no real reason and then there are other times when you are doing things to a remit, designers tend to do that more that artists they kind of work to remits but some of the best art work that has come out of not only the 20th century but much much further back and it is where artists have responded to a certain set of criteria whether that is an actual doing a specific installation for a particular gallery or a particular commission or a particular portrait or whatever so I mean I think everyone brings to a challenge and in your case it is a challenge of actually working with scientists and working from parts of the body but everyone brings their different experience and visual aesthetic to it, I do think some of your images are quite beautiful and I think that helps, I do think it helps, I think one of the bigger issues around you images is the way it is the context, I mean is there any text with the images and could they be overlapping could their be movement because I think that could add a lot but they certainly have a certain kind of beauty and I'm sure another person would do them differently, em*

J *I suppose it depends of context as well that I have flip between two very kind of different contexts where on the one hand you are working*

with doctors and patients particularly and you have got an ethical responsibility to try and deliver something that provides people with a greater understanding of their bodies to help them to, if it was my dad and he came in to find out that he had an anuerism I would want him to really understand and I wouldn't want to create some abstract piece that wouldn't really give him insight into his anuerism

SCA *But it is always slightly abstract though that we were talking about earlier and this is the interesting thing is that you are dealing in something that you actually or even doctors don't really see in a very full way and that is one of the core fascinations here*

J *It is such a foreign landscape we have got nothing to reference it with so it could be anything*

SCA *But the way an architect works is interesting are architects designers or artists I mean it is undoubtedly the case that some building in the world are some of the greatest works of art ever made, the Sydney Opera House or whatever but the actual rigidity to which architects sometimes work and how they are able to and put their personal vision onto something which is actually going to have a structural function and involve lots of other people it is quite fascinating, I mean these kind of difference between designer, artist, architect, scientist I've never had a bit deal, I've never had a big issue with them about it and I think there is connectivity all along the way and the integrity and the aesthetic thing applies to all and I think most people with trained eye the know falseness when they see it and they know things which have gone beyond the bounds of integrity although sometimes integrity suddenly doesn't stop and then non integrity, it is blurred boundaries*

J *There is not a demarcation line and you are now passing into a non authentic area. Okay one last question Gary did the images you saw today affect the way you think about your body?*

SCA *Yeh I mean I have a problem with my digestion at the moment so I'm actually thinking a lot about my tubes and stuff at the moment so I do have a sort of problem with my digestive system and I certainly did feel looking at these things I was internalising quite a lot of the stuff definitely from I suppose from your point of view is a good thing because with or without your presence and explanation there is definitely a feeling of it is in here and so I was looking at these images thinking about my own insides or whatever but also I mean some of the sculpture I make is very much about trying to get below the surface of things and I was actually going to say it might be worthwhile you coming to see what I do*

J *Absolutely*

SCA *Over the next week or two because I mean some of the images I make are about trying to get within structures and create layers and it would be quite interesting for you to see them you know*

J *Definitely, absolutely I mean it is this kind of appreciation of form and shape as well that I really enjoy and when you discover these little structures hidden away in these tiny blood vessels it is fascinating you*

feel that you are the only person to see them and you want to share them from a purely sculptural and blow them up to a massive scale to try and I would love to see what you do Gary, I would love to see your work

SCA *One of the things in my work I'm also interested in beauty versus ugly or aggressive versus placid and I'm interested in a way things which are seeming I mean in a recent sculpture I made, I'm fascinated by images of cars and busses that have been bombed in the Middle East, suicide bombers now the structures in the pack so you get these black skeletal forms and the whole form of a piece of machinery is deconstructed and some of the pieces have been making recently I've been trying to piece these images back together again it is like in a way I suppose Henry Moore would have used some sort of piece of bone and then gone on to make something which has great aesthetic beauty but it is actually from something, I mean a piece of bone if you really think about it is not a very pleasant thing it is a fragment it is that, I just think a kind of recycling kind of thing that goes on where things which are not beautiful are quite aggressive and can be interpreted I mean Francis Bacon of course if a big master of that about parts of the human body which most people might think about as being ugly but Bacon revels in the core beauty, the blood the skin the flesh you know*

J *Well Gary that was great that is bang on time actually that is perfect, that gives me quite a lot to work with, I mean I know we probably skimmed across a few of these issues but I'm just trying to tease out some of the nuances and use it as a starting point to build some of my arguments and I mean I'm bringing a cross section of people in but they are split into two groups so there will be a group of clinicians who pretty much work with images who make these images that you see on the right and there is a group of artists both from fine art design, media arts and imaging so I think from that it is almost like a process of triangulation gaining peoples perspective on integrity gaining their opinions on the work and I hope will help me place my work and develop some of the philosophical arguments that exist or the debates that exist in the area I'm functioning it, I think it has been*

SCA *I think it is interesting just one last point it is interesting for me to think of Douglas Gordon, you know Douglas Gordon*

J *No, no*

SCA *Well Douglas Gordon is a Scottish artist who lives in New York he is really famous he has just had a big one man show at the Museum of Modern Art in New York, he was a Turner Prize winner and he uses images from film and photography, there is a big new book on him actually and it might be in the library but Douglas Gordon is the epitome of this recent debate about how artists appropriate things that are already in culture like he will take a film like he took, you heard how he took Hitchcock's Psycho*

J *Oh right Yeh I have seen something on that*

SCA *And he slowed the whole thing down so it actually, he slowed it down so it actually took 24 hours from beginning to end so that the frame*

was just edging its way along for 24 hours and the interesting thing about him is how he appropriates images from culture like that and just because of his very particular vision he makes you really look at those images but also he has created a new work and it is interesting to think about what you do is that you appropriate scientific knowledge and in many cases slow it down and reinterpret it and it becomes a work in itself, I think it is quite interesting for you to think about something like that

J *That is quite a good way of looking at it isn't it, it is almost like science brushes over these structure and these forms and I'm just picking them out*

SCA *You are appropriating medical scientific knowledge whereas someone like Douglas Gordon is appropriating images that already exists in culture, films and on photographs and things*

J *I must check that out I have seen his work I just didn't know his name I couldn't remember his name*

SCA *Douglas Gordon, okay*

J *I've got all that on tape so*

SCA *What I'll do is email you maybe next week and see if you can pop up*

J *Absolutely Gary that would be fantastic*

SCA *Because I've got a new studio, I've been in the Faculty of Management for four years I was Deputy Dean for 4 years but I've given that up now and I've gone back to School of Fine Arts so I now have my own studio that I've setting up in Fine Art as a kind of research practice and there is some images in there that I would like to show you*

J *I would love that*

SCA *So I'll email you next week*

J *That must be quite refreshing to get back into the studio*

SCA *Yeh it is*

2.11. Radiologist A

Interview with Radiologist A
Date: 19/10/06
Time: 11:00
Duration: 1:09:51

J *I mean obviously a lot of this work you have seen before and what I do for every body is I have an explanation of what you are looking but already obviously with Scott and Lindsay and that you obviously know what you are looking at in terms of arteries, anuerism and blood flow so I won't give you too much context of some of the images but I will introduce them, so we will start off with this piece of artery data and what I'm going to do is this image is purely dedicated to the radiographical images and this is the MRI and CT mostly and this half of the projection is dedicated to the 3D visualisations so what I want to do is bring up two images simultaneously and discuss them and you make comparisons so Ill start with this one here, I've got basically four questions to ask you for each set of images and when I mean set two images up simultaneously and I'll take you through four questions but I'll also allow you a few seconds to reflect on the images to really take them in, just to give you obviously a bit of background and you are aware that is an MRI taken at Ninewells last year and it shows the head and neck and the high signal areas are the vessels that supply blood and oxygen to the brain, this image on the left is a 3D reconstruction of the same piece of data, it has been textured and lit and has some degree of movement by the camera and it has been looping and it is a 10 second loop, so I'll just let them play for a few seconds and then we can maybe discuss some of the issues. So the first question Graeme I've got and they are sort of two questions linked is please describe in your own words what insight each one of the images provide into the human body and secondly how would you describe the visual qualities of each of these images?*

RGA *On the MR image obviously the insight is relating to context of where the white bits are in relation to which bit of the body they are in, in a general sense the impression however is of a patchy, blotchy thing rather than necessarily a structure that is a tube that delivers something from A to B but I think it does give you the context of what you would take to be lower down in the body and towards the head, the quality of the image is obviously very flat in terms of black and white it is probably fairly indistinct in terms of detail particularly in relation to continuity as you run through the slices and the black and white doesn't really, it gives you a context of the shape of the body but it doesn't give you a context in terms of what we would see if this was in person, so you can pick up bits of an ear lobe or bits of a shoulder, you have got to infer the rest of it, so that would be an insight from that but the insight in relation to the three dimensional rotational view and texture and so is really very different it is, you get a clear impression of a three dimensional structure and you get a clear impression of tube network which is obviously it give you an impression of ?? and therefore a supply of things from A to B, the textural colour and lighting side of it is obviously of a sort that people can see red as being blood, they see red as being blood and I think the overall impression that you get from this image is actually ?? 3D anatomy unlike the other type it doesn't really produce a context and it would be difficult to say where that is*

and it doesn't really give an idea of where it comes from, the heart and going up towards the head, so I'm afraid the context is much further on that.

J *Do you feel that the interpreted image or the image that a degree of interpretation, although it is a 3D reconstruction as obviously there are things that have been added there, colour, texture and lighting and obviously camera views does it have much context in that respect, do you feel it has less integrity than the original scientific data that it was constructed from or do you feel it is not fair to make a comparison in terms of integrity?*

RGA *When you say integrity what definition are you using?*

J *Basically and I suppose it is authenticity in some ways as on the one hand you have the MR image which has a degree of authenticity because it allows you to make a diagnosis it allows you to and obviously a reproducible image as well whereas the 3D reconstruction because it has a degree of human input in a sense that I've added things to make it look a certain does it drop, does that dilute the quality of the, not the quality but its degree of authenticity, its relationship with the science?*

RGA *I think in looking at this if you've got that authenticity and integrity in relation to, does it look lifelike then obviously the 3D representation is effectively much more lifelike in relating to a living thing whereas the black and white thing really I don't think that it gives much context of something that is living or live other than the fact maybe it does that is the context of the raw shape of the head, so in other words because you can see that and if you start to put it together but in terms of the representation I think the 3D ones, the rotational one is much more authentic in a sense of accuracy.*

J *I'm going to just slow things down a bit Graeme and show some still images of these vessels in the head and neck and I want to just take you back to the menu here and just put up some reference material here and then the 3D interpreted images I'm going to put up are again taken from this same piece of data but there is a degree of focus, there is a degree of additional almost like visual material been added to the work and I've got four versions so it is a collection there is four different types of visualisation so I'm going to scroll through them all and I've give you a few seconds to look a them and then we will stop on one and just talk about one but I want to just sort of set the scene I just want to take you through each one, and I will just stop on one particular image and just use that as a vehicle to just chat through, so maybe I just want to ask you a similar question based on the question I asked on the previous moving sequences of how would you describe in your own words or what insight you feel this image offers into the human body and how would you describe its visual qualities?*

RGA *The insight is that you get an impression of a piece of tube you get an impression of it coming from somewhere going up, overall in terms of where it is coming from and where it is going to is difficult to say whether it was going in our coming out so the impression there again is the complexity and crispness and in terms of the lighting inside of it clearly gives it a kind of wettish feel in terms of that what it implies it is something a bit more living and the rhythm in side of it is certainly keeping this kind of living stuff here so in that sense it is quite strongly insight in terms of what is going on and what was the second question?*

J *Well I suppose you described both I mean what insight does it offer to the human body and what are the visual qualities but I think you have probably answered those Graeme. In terms of them, obviously there is a high degree of interpretation to this image and there is obviously a focus, do you feel in doing so that it authenticity has changed and you feel it is an enhancement or a dilution of the original data that it was constructed from or maybe just doing different things?*

RGA *I'm looking at this mainly as an information interpretation rather than a diagnostic and trying to give you that faint reference and the framework I would say doesn't it doesn't loose anything really it gives you much more than a scientific degree of what is actually present in terms of juncture and complexity it is much easier to see what is present there than it is to look at the single shot of a cross section MRI data.*

J *I'm going to jump on to move further down the vascular system moving to the kidneys an image that you will no doubt you have seen lots of times, so I'm going to put up the MR sequence and then I'm going to put up the actual 3D reconstruction that was produced as a result of this sequence and this sequence, this MRI sequence was done three years ago at Ninewells hospital and it is a sequence that I've built much of the imagery that you are going to see today but we will just concentrate first on the kidney that I reconstructed from this, the reason this scan was done was to detect a condition called renal artery stenosis which I'm not going to tell you about I'm sure you are well aware of what that is and this is a 3D reconstruction of that same piece of data using the kidney on our left and it has been reconstructed and a degree of transparency, texture and digital lighting has been added to describe the form and give some insight into the structure of the organ so first of all what insight do you feel each set of images offer into the human body and how would you describe the visual qualities of these images?*

RGA *Taking the MRI data the image on the right again you get an idea of black and white and some degree of idea of shape overall you get some idea that something is happening in the middle of the shape but beyond that, going beyond what I see on a regular basis you are just kind of ?? down I would wonder that really the ability to put it forward in peoples minds and say that is a volume and that looks like a kidney shape I mean that is still pretty hard and you don't get an idea of context on this one where in the body it is really you don't get an external view of surface or skin or whatever to say whatever and you don't get an idea of scale in terms of whether it is quite small in the body or is half the body of whatever so it doesn't really give that. The three dimensional the texture of one obviously gives you the impression of a kind of large kidney bean which is the shape of the kidney which makes it kind of recognisable in the sense of being kidney shaped, kidneys and beans to people and I think you might get some link from that, the other part of it really is that you get to see through information in terms of the structure and something going on within the kidney and you get a clear view that there are tubes coming out or going in on the kidney with your reproduction of things that people might think the kidney can do and try and relates whereas in the other you get no idea of that at all, so I think it starts to get more recognisable of being a kidney but obviously it has different ?? parts between the other ones and the vertible artery ones, colour, lighting its suggestion is more animate things in terms of ?? and this one you have got more just in terms of surface shapes and ?? redness so more like a living thing*

J *Do you think the obviously the image on the right hand side the MRI image has a high degree of authenticity because it is something that allows you to make a diagnosis from*

RGA *This kind of ?? away from diagnostic point of view if you wanted to open that box then it is common practice for me to work from a series of sciences and to build up a three dimensional picture in my head that is what we claim to do and therefore from that I can get an idea of relative size of one kidney against the other and some degree of ?? thickness or an outside surface that I know is functionally important for the kidney and it is important to see if there is anything right or wrong in there and you can start to make common sort of differences between the right and the left kidney because you can compare and that takes you some way down to working out what is wrong with that and the other ones gives you a slightly different information in relation to the diagnostic point of view if you take the internal architecture of being representing the inside bits of the kidney which is the ?? and bits that make the ?? and then that actually I can see that if that was on display of a diseased kidney then you would see diagnostic information from your 3D colour picture in a different display so I think in terms of authenticity in relation to your diagnostic potential I think they both offer quite different angles on the same thing.*

J *But in terms of sort of more wider access to the information then the authenticity of the 3D image offers more accessibilites I suppose in*

RGA *Well that is if you take out from bits of my own diagnostic point of view then I could say I would find it easier to communicate with a patient about this image on the MRI scan or this image on the pad then I think it is a lot easier to work from that one the 3D coloured one compared to the other one.*

J *I suppose something that came in and that some have commented on a lot of it is I suppose there is a responsibility on me actually working with the data and obviously to make sure that I don't change this too significantly either is there because obviously I can take the 3D data from the MRI image which is very much kind of tethered to this reproducibility model and has a degree of authenticity like you said it allows you to diagnose a condition but obviously I can change that to make it look a certain way and it would be my responsibility working with the clinical team to make sure that I didn't add too much interpretation to distance itself from what we are trying to say in terms of, to a patient we wouldn't want to make, I wouldn't want to smooth something on the kidney to particularly to, it may be related to the diagnosis.*

RGA *I can see why you would be concerned to make that transition and if you were wanting to use the 3D coloured ones as a tool for diagnosis*

J *Or even a tool for patient communication as well*

RGA *You are using for a tool for communication then I don't think it is much of an issue because you would be using it as an illustration to inform the patient you don't therefore have to be quite so firm about your accuracy of the true representations because, although maybe that patient's kidney can indicate there is a illustrative aspect to it and that it is not an expectation that it is absolutely truly accurate. This is a sub text to that, something that is based and they can see MRI scanners and CT scanners do go some way to a colour representation on the screen and there is always a concern almost the*

clinicians reporting these things is that are they taking one step away from the true source data so there is a concern about that but I think if you keep it in the patients information situation an illustrative sign although it may relate in this situation to their own kidney which is the ?? there is more tolerance of softness and accuracy.

J *That is good, thanks we will move on to one, another image here which is the same piece of data but it has been interpreted in a very different way, it has very different lighting and has very different colouring and this set has obviously been put on its side now obviously it may not have a obvious purpose in patient information but how would you describe what insight this might offer into the human body and how we should describe its visual qualities?*

RGA *The insight into the body is basically it gives it a certain bonding and gives a certain shape to the overall outside structure of the kidney, it seems a bit lumpy and bumpy which is of interest and you see the kind of part of the kidney that the tube comes out of and the bits attached to it and that is, it takes you back a little bit to the kidney analogy it is a bit similar to what we might think of in terms of what people might say the kidney shape and therefore it kind of therefore closely resembles that. In terms of the visual impression then obviously the colour ?? a bit in terms of being white and grey or cream and grey and basically pretty flat from a living point of view it is quite good at showing surface information, I mean that in a technical way in that you can basically see the lumps and bumps a bit more, it is not, if that was in a living thing you would expect it to pop up in the anatomy department of a well preserved item in a jar rather than being something that is representing something that is living and it doesn't really have a feeling of, a lesser feeling of worthiness which associated with something coming out of the body.*

J *I'm going to move to some data, some CT data now and we are going to look at some anuerisms, now the image straight ahead of you is a CT scan of the aorta, an abdominal area and it was used in the diagnostic set of images used to detect a condition called abdominal aortic anuerism and the image on the left here is the same piece of data that has been reconstructed, however this is the first level of interpretation and there is very little colour and there is no lighting that has been added and it is an orthographic projection also so it has not got the kind of sophistication of the previous images but what is does show is the ?? the anatomy is and obviously the anuerism so I just wanted to ask you Graeme first of all what insight each set of images offers into the human body and how would you describe the visual qualities of these images?*

RGA *Taking the slices of the CT scan the comments about the integrity or it does give context and you can see running through from the top to the bottom and that is serves a bit of knowledge behind that, it is in context within the body of something going on and you get an idea of quite a lot of complicated bits and pieces some of which are more well described and they have an outline to them and another is ?? along the outside which are a different colour of white and I think the impression of that is the grooves within the pelvis, in terms of picking out where the problem is on that scan then I think it would be much harder to point your finger and say there is the problem or there is an issue there of that knowledge that that has in terms of what is what I'm looking for and so in terms of insight it certainly gives you insight to complexity within and that it is an outside shape it actually gives it context in terms of integrity*

and it does have integrity in terms anatomical accuracy throughout,

J *I'll just you Graeme on a sort of radiological level there is a lot of white bits that are sort of on the inside of the aorta because a lot of people have been asking what they are, is that calcification?*

RGA *Yes that is calcification of the wall of the aorta*

J *Sue Black was asking me yesterday and she thought that was what it was but I wasn't sure*

RGA *That is right because it is quite, in saying that the bone was white then calcification is dense and so it shows up as that, that is why you see it that way.*

J *She told me yesterday when we were digressing slightly she gets her medical student when they are doing cadaveral dissection to squeeze the aorta to hear the crunching of the calcification on the inside.*

RGA *Yes, I think the textural it is quite crunchy it is alive and dead and basically the other one I mean is clearly the colour used on the tube of interest which is very helpful because it takes the bit that is different from the other bit which is coloured as being kind of bone and you get a clear idea this is different from that so it is giving some anatomical integrity so say one is about this on the other bone it gives a relationship obviously in relation to the top of the pelvis and the ribs and the back bone in terms of its position, you can fully appreciate from the other scan yeh you get an idea of the shape of the tube in terms of the fact that it is bad in the middle and that is without knowledge based ?? that we are looking at and another thing is it gives you specific information about the blood vessels at the top the red bits coming out of the side that then go to the kidneys so it has a lot of integrity in terms of the anatomical information in relationships in terms of the visual appearance it is obviously much clearer to point to one thing or another, saying this is that and this is that so there has been a lot of guidance and the other thing about it is that you obviously get a background grid or graticule that allows you to give some relative sizes of things which you didn't have on the other image.*

J *Okay I've got a couple of other images Graeme that are different angles of the same thing and you may not want to add anything to it, what you have already said which is a really comprehensive breakdown of what is in the image*

RGA *I think the difference with that one is obviously the light and the texture has changed it is a bit softer on the surface, shading alight, again it gives you the idea of something that is a bit more likely to be alive, it doesn't give you an clear concept of movement and the other thing that a projection which is an offset projection gives you is the twist going on at the top and that is to a ?? is quite an interesting thing that you are aware of because as we are talking about a tube and the thought about expansion of the tube or twist and kinks in the tube are of interest.*

J *Is the torcherosity part of the disease or is that just something that happens through age or*

RGA *It is an age related finding but it is a common part of the disease as well.*

J *And these are obviously a more forward orthographic projection of the same thing*

RGA *That has a bit more colour and light and ???? a black background obviously makes things leapt out a bit more clearly.*

J *And do you think it, obviously this is an enhancement from original data, or do you think it is a dilution of the original data? Or again in to context and purpose*

RGA *It depends on what you are using it for if you are using for diagnostic point of view then it is probably the same it is clear on the image on the CT scan exactly where the, what you are actually looking at it is the real bit whereas probably on the 3D one it has been represented with stills and whether that is a drawing of the inside luminum thing more or if it is the outside wall. But there is the impression that it is different the fact that it is rough from that point you can image that that is almost looking like a tree splitting situation of a tube and something has happened to it which is not, you don't get the impression at all from the CT scan and that maybe a mistake of course because it may well be part of an art representation it has gone through and in a sense that way it is slightly misleading, in terms of another input which is kind of saying well can you plan from this in terms of a surgical plan what you might want to do then the planning situation is much better from the image that shows the 3D rendered in that sort of assessment, but it depends what you are trying to use it for, in terms of describing to patients what might be wrong with them and what we are going to do then this would be very, the 3D would be much much easier a thing to have a discussion around.*

J *I'm going to bring up some moving imagery now and this is some pulsing data I've taken from the vascular data sets and first of all I'm going to put up, so the image straight ahead of you is an MRI performed at Perth Royal Infirmary and this is a cross section of slicing of a pulsing heart and this is a reflection of a real time pulsing heart although the images was acquired across several heart beats and produced in real time sequence and the image straight ahead of you and on the left screen is a reconstructed image and in a sense it is slightly more complex because it has been reconstructed from several sources, first of all the first source is taken from a scan piece of data so the tubes or the vessel of the aorta here is taken from the original kidney data set that you saw a second ago but the red blood cells have been added in an interpreted process where I have used the vascular or the heart cycle and produce an image and on the right hand side to inform the movement so it is not a translation of the data it is an interpretation of the movement and obviously the red blood cells again are not reflective of reality they are oversized and there is a lot less of them than there would be in a normal flow of blood through the aorta but what they are there to do is enhance the narrative so maybe if I could ask you Graeme to just describe in your own words on what insight you feel these set of images offer into the human body and how you would describe their visual qualities and integrities?*

RGA *Taking the beating heart and the insight there is obviously something within the body which is doing a beating thing, it has a certain cycle to it and it is changing size and there is a squeeze going on from the top right hand side of the black bit and also there is stuff that seems to be oozing out one side or moving out the heart cavity all that is very informative about the pumping*

nature of the heart and the muscle that has been pumping the blood that is being pushed out, its authenticity is obviously fairly high in terms of anatomical information and what a muscle is doing and what the blood is doing and obviously there is valve information as well so it is very authentic, the last section which is the quality of it obviously in terms of a very vital structure within the body it is not very alive other than the fact that there is movement it is flat it is black and white there is no kind of feeling of that being living it is only when you start to look around a little bit more you see other bits of the image moving, you have very much caught the heart but if you start to look around there is not that much other movement going on there is some stuff happening in the mine field which is interesting in a sense of each pulse you can see it actually lighting up you can see the idea of the ?? as a pump and a supply and that is quite interesting but it is pretty flat and it is pretty dead looking other than the pumping action and in terms of white ?? being a representation of blood then it is far away from what people see as being what the heart pumps.

Moving on to your flow in terms of whole textural thing obviously looking at the flow down the vessel and in a different views you get a clear idea of movement, pulsitivity in many of them and the actual clarity of view that these are red blood cells moving through the tube an therefore if you are informed about blood cells, which is a great assumption I suspect then that one is actually quite insightful in a sense of that you are ??? movement ?? in fact that it can move forward and then it is not moving for a while and then stopping for ages it is a kind of ?? situation it start kind of moving around and then there is one with ?? you don't get much idea from that about the wall interaction and all the things that you describe you have things that are rolling and rumbling through something and I think the other one is that you get far more insight what happens when you get down to branches, the red blood cells got a choice which tube it goes down to and the other thing you get is a bit of interaction that is happening at the bit where it branches and that is interesting and insightful. Authenticity wise it is, if I had known it was coming from the aorta then the authenticity would be with the particle size as obviously very exaggerated but accepting that as a kind of assumption of what has happened then that, it does appear authentic in terms of the right sort of feel for flow and blood and stuff happening.

J *I'm going to move onto a final two images, I'm going to bring up two interpreted images and one MR image now the image straight ahead of you is an MRI image of the aorta just one slice and the image on the left is inside that is an interpreted image of inside the aorta and I just wanted to maybe ask you to comment on what insight these images provide and if there is any visual qualities that you feel they have and it could be a negative response to this as well?*

RGA *Sure in terms of the image quality the black and white thing is black and white it is a kind of white linear ribbon flowing down the middle with kind of off set something coming across the side and you can't really, you don't have that in context as to relate that to much I have to say to the extent that you are actually thinking about a tube and that can be taken many ways in terms of your sense of forming a tree or something off this linear, the fact that it is kind of curving it is more likely to be a thing an animate thing that something has moved and it makes you think about a ribbon or something that is flowing in a river or whatever*

J *Well somebody said yesterday it looked like the Amazon it was reference based*

RGA *Absolutely so really without the context you really struggle to put that in the box as being alive, the only thing that gives you an idea of movement is this kind of twist to it like a river but beyond that you are not making any idea of something that is living and moving and so I think it is pretty flat in the information vehicle and the other one is really the information is that you get light from a tunnel albeit light from a kind of far end on the right you really get an idea of a tube really it has a ?? filtered red space it is more likely to be a galaxy ?? thing than something within the body obviously a bit of knowledge than kind of biconcave red blood cell takes you back but you are pressed to say that was trying to represent something within the body rather than just within a red jar of blood there is no sense of movement and there is not really a sense of that it is moving at all from left to right or up and down or what is happening, you maybe gives you an idea of something in the tunnel effect this light source at the far end at the right, if you take it from that then there is probably not much in it from movement*

J *I'm just going to put up another image Graeme and this is the last image and maybe you can just describe to me the kind of visual qualities and integrities that this might offer?*

RGA *Well the visual quality is obviously a tube and there is particles within it and you ca see that they are all sort of lying flat and they are all aligned in a certain way so there is something that is making them aligned up in that way, you get the impression of a tube and a kind of branching thing coming up towards us with particles heading off*

J *Again this is taken from the originals scan of the stenosis*

RGA *So it you have got the context it makes it a bit easier to say okay this is a kind of tubey with red blood cells in it but if you take it very flat ?? then you struggle to call it alive there is no movement and the colour is a bit funny or comparing with other stuff you have done in the first one of the vertible arteries and so on it was probably easier to say that was tubing of the artery so the visual impression that you get an idea of a tube, once you have got context of the different blood vessel then you can get an idea of the tubes again, you can't really tell, well I suppose that isn't true you get an impression that the far right hand side there is some sort of explosion going on, with the dents up the tube there it seems to come down and you get less number of these red blood thing further down you get the impression that stuff is coming in from the far right image and with that knowledge you can probably be guessing a bit but you do also get a ?? red cells they are following round the tube*

J *Okay that is actually great Graeme, that is the end of the visual part so we are just going to take a seat for the last sort of ten minutes or so and just discuss a couple of issues, well not issues but just this notion of integrity. I've set up a table and a couple of e-maps to describe the point of generating the imagery and then what I'm going to ask you some question on art integrity versus science integrity and so forth but obviously whenever I construct and image there is a high degree, there is interpretation but there is obviously a high degree of knowledge that has to go in to developing them to gain insight into the development so the obvious starting point is the anatomical*

references and trying to work out what it is I'm looking at, obviously it is hard that it is all built it in 3D but you know using these anatomy images are the first starting point and the second place is to come and speak to people like yourself and Trudy and the drawing that we do and the emails that fly back and forward are also part of the process of developing these images and that feeds into the aesthetic, it fees into the way things look and also there is like less obvious input that go into the work that again are not really that scientific in a sense that this linkage is with the real world and I think you picked up on it briefly this kind of like celestial influence that comes through the work, this creating into the abyss almost and that kind of language of this sort of space exploration is something that I kind of use quite a lot as a mechanism for jobs, people who then view the images and I mean for a start a lot of images are set on a black background which obviously stimulates that sort of feeling but obviously as well as dipping into other more traditional media particularly lighting because when you deal with these types of data they are not naturally lit you have to actually apply a little digital lighting and in doing so you need some for of reference you need an influence and you need some sort of, and I've used kind of historical influences a lot of the time particularly paintings, Vermeer and his work and some of this contemporaries and Caravaggio and so forth and it has really helped in the process of developing what imagery to light the work and to build in sort of references and particularly in a lot of this stuff as well and it is almost like a language that helps the viewer as they look at this stuff as it focuses their attention into what they are looking at but does it in doing and having a lot of these sort of fairly nebulas reference points does that dilute the integrity and authenticity of the scientific start point as we are all agreed that the work that I do starts with the images it is starts with the MR scans so does it move it away and hold that thought for a second and we can talk about it in a minute but in contrast to that this is more kind of recent work which you have probably seen me with and this is using completely, using a start point that is not actually from the scan data because actually an accumulative knowledge that I have now gained based and interaction with yourself and Trudy and some of the other staff in radiology is building models that are based on just what people tell me and anatomical references to sculpt the stuff that is not taken from the radiological data but because I've seen so much of the radiological data I kind of build these things and do they have less authenticity if they have not started with the scientific scan data and again these are kind of questions that are hanging in the air and the sort of third thing is again when I build the images there is obviously there is indirect influences that I have, I mean I'm not a radiographer but it helped me build the work but I think that probably from an academic point of view valuable to know because they do shape the way these things look and obviously if you are using them for various purposes and things it is good to get some knowledge on them, I mean this is a total interpreted image, this has been built from scratch and not from any MRI data although the MRI data and this is a slightly kind of, I don't know if is a red herring or not but this is a mammoth, a picture that I took of a mammoth at the Museum of Natural History in New York but then if you look at this piece of data you can see where the ?? of this particular point of view so there is a high degree of influence that goes into the work and it is not just based on just purely the translation so I suppose the question I am constantly asking myself and it part of the reason I wanted to do this experiment is this notion of, I think maybe you have answered it a little bit Graeme this notion of ?? if there is a high degree of interpretation if this stuff does get far away from the scan data and you do get influenced by for instance a mammoth does it make it less valuable what you are doing, does it mean you are taking the work a bit more

diluted, do you want to grab a seat on that thought Graeme and just hold that thought in your head.

RGA *Difficult*

J *It is difficult and I mean I think that is part of the research but the first question I wanted to ask you to start with was what would you define as visual integrity in your own practice as a radiologist an interventional radiologist as well, how do you gauge when looking at a picture*

RGA *As you know my interest in this is spreads from the diagnostic helping you to decide what is wrong with somebody and how big the problem is and how you might fix it, which is the cold diagnosis, planning a management plan and then as you know using, up until now that is what we have used the imaging for to supply data for that box, making the question right it has to be authentic, it has to be accurate and it has to be measurable so you get the right treatment and that is very scientific, qualitative, emotional, no communication involved other than to a colleague or how to persuade a colleague that this is what is wrong with a patient and get them to agree that is what we are to do, so that is it yep and that communication has very much been a scientific box and the other end of the work as you know is basically the interest in how you make the communication and it is all about increasingly about patient communication, there is a huge growth of requirement, quite rightly for patients to understand what is going wrong with them, to buy into who is telling them and why and how they know that and what it is that is being planned and advised for them and the need to know is much greater both from a personal point of view although that does vary to a society point of view which means that we as observers of diseases like imaging wise have a responsibility to communicate that back to the individual, much more so and that is a society thing not just an individual thing, you will still get patients who come through who don't really want to know and just want to say 'I'll you what to do doctor I'm in your hands' and that always increasingly give us the medical people heebie geebies because we know we are not doing the society thing appropriately for that patient so if we look at the challenges of the second bit which is very much communication then does it matter so much about true authenticity and getting away from the absolute scientific image, no if it communicates the message appropriately and I don't mislead the message yep*

J *So there is an ethical consideration that must be taken into account in that context*

RGA *For sure and I think it is also ethical to make patients aware to what we are looking at is modified it is not necessarily exactly as it is and to say this is a tool that has been used for communication, I mean you don't say it in that way you say the machine takes a pictures of all the people and this is a bit similar to your problem and we try to show it this way and I hope that it helps and you introduce it and then off you go so there is an ethical, you can get the process correct there*

J *It is almost like an honesty as long as there is an honesty of transparency you are not negating any of the authenticity you are not detracting from it you are just telling people where the start point is*

RGA *And then you get into this area of communication of how best to use images*

to illustrate what you are doing and I think the artistic influence is absolutely relevant because that is what we see around us all the time in terms of artistic impressions whether you are an avid going to the art gallery and see Vermeer or whether you go to the theatre and see a darkly lit stage production, the lighting and the visual impression and the message, the communication that is not a million miles away from what we are trying to capture here to the use of it I believe is validated in a sense by the openness and in some ways you could argue and this is me getting a slightly over the top is that you could argue what in doing it that way you are holding your hand up to say this has been quite manipulated this image because people look at their Vermeer or the stage thing and maybe it is different and as being not a manipulation because they are giving an impression on what they are seeing

J *Like a stage*

RGA *It is and they have chosen, Vermeer has chosen to have the light coming in off the side or the theatre director says we are going to have the spotlight coming down through shimmering damask onto some blob on the floor and it is done for a reason and it is all about communication and the ability to do that, an artistic impression which is entirely valid in the communication setting you just came at the end of it and was it right to just play the arteries in the context of the tusks and to me it is the reason you stood in front of the tusks and took a picture that way and the same way you can stand in front or visually put yourself digitally in front of a three dimensional structure is that it gives an interesting shape or perspective, the fact that you picked it up first of the tusks and you are using it for some of the ?? is largely irrelevant it is just an interesting view point perspective so I wouldn't have any, and this is my own personal view I don't have any problem with the way that comes through because often it is the interesting perspective visually which wakens up peoples interest in the image and makes them more communicative with the image and thereby getting the message behind the image, if you produce a very grand, something like the white kidney marble thing then it is not a particularly interesting perspective of colour or lighting or whatever in some ways you can view it like that and if it doesn't really engage the curiosity whereas the wetness one and the one that you can see through in a shape gives you curiosity and curiosity is in a sense required for communication because if the other person is not curious about it they will just sit there and think about what they are having for lunch, does that make sense*

J *Yeh*

RGA *So I'm trying to put it in context what other things do I see just going round, yeh the other thing that struck me was and you will forgive me this wee bit perhaps the, if you take who is the one person that converted true observation of animate human form into both scientifically accurate drawing and*

J *De Vinci*

RGA *Exactly so within that context you have got quite a happy stomping ground within a precedent artistically the people can accept that work both in terms of its absolute quality of scientific line drawing based on incredibly good observation perhaps you are a bit luckier than De Vinci because you have got MRI scan that can give you that insight without losing the dissection you were putting together in your head and you can see it move and all the other things*

so you have probably had a distinct advantage and the work is equally good but you can move the same individual can move from a very scientifically accurate drawing representation through to an artistic thing and it is all about what you are trying to communicate in the same way that you could it turn it on me if I was a communicator, sorry in terms of what I do I can work with the scientific imagery of the MRI scan and should feel quite at home moving into more artistically rendered interpretative modified if you like image for the purpose of a communication, does that hang together

J *Yeh it does actually it fit well with the next questions*

RGA *Oh dear*

J *What role do you feel the artist should play when working with medical scan data and obviously you have been quite close to the project Graeme and you have seen it evolve from the start and can see where it is going now and I mean some people call it a translator, mediator, illustrator but*

RGA *It is all that isn't it and I think there is a responsibility in the role which I think is very important for people to recognise is that there is a responsibility to be knowledgeable to go and look and to find out about and try and understand what the underlying communication requirement are if you are you going to move things out of the cold scientific box into a sort of tool that can be used if you are going to use it that way, you do have great responsibility to be accurate as much as you can but to be aware of other things and there are around some pretty scary representations of things which have gone too far away and have been irresponsible, I mean there irresponsible in terms of what you do with it because you can take the artistic thing right through to the gory end point of a bloody mess and in terms of communication would I use that as a tool with patients that come in, well no way so it is rather cut it off in the foot so there is a responsibility and the other thing I think is to do what you are doing at the moment which is to gather widespread views, society views in terms of what you have done because what you have had up until now and what people like you going into this area will have to do going forward is to make sure they don't just speak to the medical or scientologist people who maybe looking for a scientific accuracy and all those things because that is where they feel comfortable with and you have got to get the range, so I see quite a big responsibility*

J *Do you think is almost like we are almost defining it a role which doesn't exist in the medical profession you don't have artists working in radiology and in theory we are almost like, do you feel we are validating that or do you feel we are trying to build an argument to have that person, almost like communication/interpreter, I don't know, that is not one of my questions but I just*

RGA *I think clearly if you hadn't pitched up and done this work then there wouldn't have been that box open to ask questions around quite simply and therefore I do believe there is a role for it , quite rightly because I can see the benefits in terms of patient communication which is a very major role in what we do, how do you validate it, well I think you can only validate it by going down the route that you are going which is to, and at each stage trying and validate your steps and get informed views, does that answer it, but I think that is right, I think there is a role and I think the, you have worked very much in the vascular territory but I'm sure you know there is lots of other groups who have*

communication challenges and who might well find true value in this.

J *I mean it is funny because it seem to be a different opinions coming back about and particularly from the medical people that have been interviewed so far there seems to be and in this sort of work it is a very kind like we are working with data we have got a start point and we are working with scan data to give insight into the human body for instance and obviously give patients and there has also been a suggestion and I've heard this before of using an additional communication like an analogy based process using metaphors like the plumbing one, you may bring up a really nice image of the aorta and what not but often it may be useful to bring up like an additional image or additional simplification of the process as well as the heavy weight scan data, maybe that is just not something that we are interested in this research but*

RGA *I take you point entirely because what is the, the communication is not going to be as you have today which is no audio overlay just a set of pictures because it doesn't tell a story, you don't the context, you don't get the key points that the person who is communicating wants to display or show and as soon as you get an audio-visual thing but particularly more an audio-visual or personal thing because what patients really want is a personal discussion with the white coat effect, somebody who knows, somebody who is giving them advice and you want to be able to see them and chat about it you don't want to do it over the phone, they don't want to get a DVD of their condition through the post they want to have a chat and now what that allows you is to use the right imaging, imagery medium to inform the discussion and depending on the individual and the style I think you can modify what you say around the image description from what you can image is the more male engineer approach which is to use the plumbing analogy you can easily verbally use the plumbing analogy while relating it to something which is much more animate and the message to the engineering is they can understand where they are coming from the route and you can see why the image is still advantageous because it puts it into a live context whereas if you don't have an engineer or, not as an engineer someone might take that away and you are dealing with people who don't understand or their minds don't work that way you can relate it in a different way and that is probably the art of communication isn't it.*

J *That is right and that is probably a good way of putting it because you still need the health professional and their judgement and their experience to decide the best method of communication but he also has these tools in his arsenal to bring that in it is almost like acting isn't it, it is the blended approach to learning you can never just one golden bullet it has to be a series of mechanisms and the appropriateness that one size doesn't fit all. That is great Graeme and one last question and I'm not sure if it applies to yourself because obviously you have got real medical insight to your own professional practice but do these images affect the way you think about your body that you have seen today?*

RGA *I think that is pretty tricky because I've probably seen a number of them before but I think it, well my own body I thin probably I'm always struck by if you put up a different visualisation of something that is taken from other peoples scans and you say oh that is interesting, that is happening inside me and that would open and I think it does have a low level impact both in terms of variety of appearances etc so if the question relates to what is the effect of*

these images to somebody who hasn't got a current health problem of which is directly relates to does it affect what happens inside you and you know about it then I'm almost convinced it will have an informative effect in general population, situation and educational thing and that is where is see that going as art a general exposure thing

J *I think that is right I think this is the constant conflict in this project that we are all agreed there is a definite context there one to one communication and we can see already the validation process we are doing with the patients is starting to prove there is a ?? with the voice over what is happening and some data they really do get something out of it and it increases their ability to ask questions and they feel empowered and there is all those things, the more we do more patients will probably reinforce that argument but there is also a broader audience for this work you could argue that people have a general interest in their bodies and you watch these documentaries about nine months of pregnancy and they show you all these beautiful images of the foetus and the development and your grannie is talking about for weeks and then the guy wins a science award and it is up in the science museum and there is a book comes out and there is an appetite for that and it is almost like this work that we are doing it has a dual purpose sometimes we are on the ground helping a, it is like the TV commercial versus the feature film we are selling Flash in ten seconds but there is also like the Apocalypse Now approach where we could make a longer more profound input on peoples lives in terms of not public understanding of science but people when they look at these images and you find out where they are from and oh well that is really nice and it really stands up in this art gallery space for people just to sit and look at find quite pleasurable which differs from the short sharp, you know 30 minutes with a patient with renal artery stenosis and they both equally as valid but they both have a place and I think that is maybe the conflict I'm trying to, but its not a conflict but it is maybe a victim of the work, it moves between those two spaces*

RGA *So it should but I think that you have demonstrated today that you can take it out of the communication environment or one to one round the screen in a kind of cosy confidential chat about a problem that a patient might have and you can just start to ask people questions about how they knew what is going on and the power of the thing about all this stuff is actually, it is actually quite awe inspiring so if you take it into an art gallery situation or into a public display situation then it does have an affect both in terms of people stopping for a moment in an otherwise busy life to actually say that is remarkable and that is remarkable message can also lead into another message which is when you start to look at things that are not quite right you then I'm sure subliminally you fire off a message to the individual to say oh I hope I don't turn out like that or what can I do to stop myself being like that*

J *Well I think the anuerism one does that I've noticed in a lot of the people we have brought in that the abdominal aortic anuerism it is really quite distressing for people because they realise and it brings out a lot and a couple of the people that have come in have actually made personal references to people that they know of who have had this condition and even though it is a very basically rendered image it does have a sort of public context because it does look really quite frightening when you see how distorted and the tortuosity of the vessel*

RGA *I think that is right so maybe start this off, we started off in terms of saying is it*

just a bit communication one to one about a patient problem or does it go onto a wider canvas in terms of peoples awareness, does that have an effect on them, I've got no doubt because I'm always struck by when you go around the out of date science centre basis that have got images on show and there is a lot of interest in them but they keep showing that, in fact it could be so much better and I think almost when you have got, some of the images are shown off in these places are okay for a while until everybody has seen the image on TV or in various places or a similar thing and then actually it becomes a bit less of an impact because it is accepted that is the way that is and the challenge is keep it moving ahead of that

J *I think that is the most interesting part for me because being exposed to people like yourself Graeme and your team at Ninewells has give me a real insight into how deep we can actually probe using the instrumentation as well because I wouldn't be able to see any of this stuff without the tools that the instruments provide and they are constantly changing they are constantly moving what you could see 10 years ago is very different from what you can see now and that clarity is going to increase and as that clarity increases I get richer material to work with so it never ends and that is why science and art are so useful when they work together because we constantly feed each other with new material and you can't do that if you work in isolation, if I worked, if the model was and I think that is probably why the last few months have been quite difficult in terms of placement and art because that whole kind of working relationship breaks down when you break the links because it would just be like throwing me a disc and*

2.12. Radiographer C

Interview with Radiographer C
Date: 19/10/06
Time: 00:55:00
Duration: 1:18:31

J *So basically on this side of the screen I'm going to show you some of the radiological data, this is the scans basically some of them you have seen before and some of them you won't and on this side I'm going to show you the 3D work and I'm going to ask you four questions related to the images and I'm going to bring up images together in sets so there will be an image on this screen and an image on that screen and they we will go through and I'll give you some time to reflect on the images as well so you will have a couple of seconds to just look and see what you viewing. I'll give you a bit of background but obviously you have the benefit of medical training to give you an insight but for the sake of the sort of consistency I'll just give you a run trough what you are looking at, obviously straight ahead is a MRI scan done in Ninewells in Dundee and this is cross sectional slices of the head and neck and obviously the high signal area, the white areas in the image are the areas of blood flow and arteries that can supply blood and oxygen to the brain, on the left here we have a 3D reconstruction and this has been built as a result of this data here and it is a reconstruction of the data in that scan and it has been used to inform the shape but other things like lighting, colour and the texture of this image has been added and this loops for a bout 10 seconds this image on the left here and it has alternative camera views of this particular piece of data so I'll give you a few seconds to watch this through and then I'll ask you some questions. So please describe in your own words these images and what insight they offer into the human body and then the second question is how would you describe the visual qualities of each set of these images, so maybe you want to start with the MR*

RC *Well what I see if the contrast agent is the high signal and it has been used to identify the actual main arteries going from the heart up into the neck and head and into the brain, these are very clearly identifiable however they are only slice at a time so if you were taking one individual slice it wouldn't give you all the information that was required, it is very obvious that you need to have the full set of images which are actually shown to produce any identifiable anatomy of these arteries, they are clear as much as the patient hasn't appeared to have moved but from what I can see if the actual anatomy itself it is relatively normal from my experience, what was the second question*

J *Second question is the visual qualities of it*

RC *Visual quality, em as an MR radiographer I think the visual quality is pretty good it is quite high standard imaging, the patient hadn't moved so you are actually able to identify all the aorta and all the vessels coming from the aorta even the small vessels in the brain as well.*

J *And moving onto the 3-D image, and first of all, what insight do you feel it*

offers into the body and some of its visual qualities?

RC *It shows tortuous vessels, it makes it look as if they are more real not just straight lines as in the other images, you can actually see the, imagine the flow in each bend of the artery, I think the highlighting certainly parts of it actually does give you better visualisation of actually how they do bend and they are not just straight blood vessels which you could actually when you see them on that one you could imagine it was more or less straight, on there you can actually see how tortuous they can be and I think it is the fact that it is in the highlighting actually makes it more realistic and the way you have turned it round into the 3D makes it more easy to perceive so if there was any abnormality then you would be able to identify it, it would be a lot easier than just looking at the source images over there.*

J *How would you describe or how would you rate in terms of its less or more the integrity of these images, I mean obviously I should maybe define what I mean about integrity but in terms of authenticness of the image baring in mind one has born from MR data and the other is a hybrid of both the MR data and visual interpretation and additional information it is not scientific?*

RC *I would say it was very realistic and you can imaging the dissected body I would imagine that would be how it would be viewed, I think the 3D does gives a better interpretation of the anatomy definitely*

J *Do you think it is an enhancement or a dilution of any of the data?*

RC *I would say an enhancement a slight enhancement*

J *I'm going to slow things down and I'm going to put up some still images and what I'm going to do is I'm going to loop four images after the other one and I will just let you look at them and then I'm going to stop on one and we are just going to talk about it and then I'm just going to put up one and we will just talk about the one, maybe just talk about this one here and I just want to ask you Wendy but obviously I'm just putting this MR image up for reference to remind you of where the data has come from but how would you describe this image and what insight it gives into the human body and visual qualities*

RC *This image on the left?*

J *Em*

RC *I would say it is probably not all together clear because it is flat image if you like, it is not moving, it may not be all together clear exactly which part of the anatomy this might be from although I do know it is part of the upper, intra-cranial, extra cranial vessels and outside the head, it doesn't give the same information as the previous moving set of images*

J *Do you think it has got less integrity and less enhancement or do you think it is just a different type of*

RC *I think it is a different type I mean if it is highlighted again you can make out that they are vessels maybe not just quite as easy to see the pathology and relevant anatomy but I think it is enhanced but not to the same extent as the previous ones.*

J *I'm going to move onto to a second set of images and I'm going to move further down the vascular system into the kidneys. So the images that you are looking at and the image in front of you and straight ahead is a again an MRI image that has been taken of a patient who came for a scan at Ninewells hospital and these are cross sectional slices again and this scan is performed in the diagnosis of a vascular condition call renal artery stenosis and this is a serious condition that occurs when the vessel feeding the kidneys becomes blocked or narrowed due to a build up of arterial plaque and this may result in a surgical intervention by the clinician, now on the left hand side this is a 3D reconstruction of one of the kidneys from this particular scan, the kidney actually on our left looking at the scan data and this has been reconstructed using 3D visualisation techniques and it has been digitally textured and lit with this degree of transparency being added to allow insight into the internal structure maybe I could ask you first of all Wendy how would you describe this image in terms of visual quality and what insight do you feel it gives into the human body?*

RC *This one?*

J *Well both of them and you can make comparisons if you like.*

RC *Well the MRI data again although you are able to see if slice by slice by slice building up a picture it is very flat the two dimensional but the quality of the image as a MR person I think are good but a slice by slice doesn't give you the full overall view again not necessarily just one slice would give you the relevant business of pathology. The image on the left I think is an excellent diagram of what I would have visualised the kidney to be although I cannot see if from that one where the patient has got a renal artery stenosis but the whole visual appearance is very good even though it is not a moving image it still, if it was moving it probably would be a diagnostic image but again the fact that it is transparent you could probably compare them and identify them as being the same kidney especially where the renal pelvis has been filled in there you can see it quite clearly on the other visual image, I think it is excellent.*

J *And do think in terms of its integrity and enhancement do you feel, which one do you feel offers more authenticity or are they just offer different types*

RC *They just offer different types, I would say, I mean we know that that is real imaging from a patient but whether anybody coming along could actually say that is what that is, whereas maybe you could come along and probably very clearly identify that as a kidney.*

J *I'm going to put up another image Wendy which is a slightly different image, I'm going to keep the MR scrolling through here and this is the same kidney the same piece of kidney data but it has been visualised in a different way, it has been lit in a different way it has been put in a different scene and it has been textured very differently and just ask you maybe to describe the visual qualities of this and what insight you feel it offers?*

RC *I think the visual quality is good it gives a good example of the surface of the kidney you wouldn't necessarily see the inside and the functioning or the problem that you are looking at in the kidney but it gives a very good surface area of the kidney, I think the lighting is good the way you can imaging that is a real kidney compared to that image I would say that does look more*

realistic than anything that you can produce on here on the flat 2D source data, it looks more realistic and has a quality and it is good and the lighting and things.

J *What would you say about its integrity or is it an enhancement*

RC *I would say the integrity is very good whether it would enhance, it is more enhanced than the previous image I'm not quite sure, I think it looks more like a solid, it probably is representative of that kidney up there it probably is em as far as integrity I would say I would imagine that kidney would look like that.*

J *I'm going to move onto another set of images Wendy which are taken of the abdomen, they are not MR this time they are CT and they show an anuerism in this case, I'm going to put the anuerism image up first and if you just watch that scroll and I'll just restart this machine. So I'm just going to bring up the 3D reconstruction but this is a CT scan and these are slices taken through a patient of an abdominal aortic anuerism and this is a 3D reconstruction of an abdominal aortic anuerism and it is the same piece of data then has been reconstructed from the CT but it just has very basic camera views it is an orthographic camera view straight ahead of the anuerism and it hasn't been kind of lit of rendered in the sophisticated way that the other images have and maybe I would ask you to describe in your own words this image and what insight you fell it offers into the human body and some of it visual qualities and maybe just talk about both of them?*

RC *The image on the left I can see the markings of the bony skeleton in the background and highlighted in the red are the main blood vessels in the abdomen it shows quite clearly the renal arteries coming off the right and left renal arteries and the way it comes down it shows a very large dilated anuerism that goes into the where it bifurcates into the iliac arteries, the quality is good, it does give you an indication in one plane or in one direction of how big the anuerism is, you can't really tell from any other plane in a different ?? direction or whatever or if it is a ?? direction exactly how big it is but it is a clear image, it is clear. On the right the source data of the abdominal CT does show slice by slice a normal aorta going down and into a very dilated anuerism which has calcification round it and down into the iliac arteries, I don't actually see calcification round the walls of the vessel on that left hand view but you can imagine actually if that kind of imaging or quality of the image that people could see that in a very different direction, just maybe not, this is a flat 2D image it is maybe not giving you all the information but it does give you good visualisation of what the anuerism is about, where it is, roughly how big it is*

J *Do you feel that that image there has a degree of integrity or authenticity?*

RC *Authenticity yes definitely*

J *How do you think is compares to the original data or it is just for a different purpose?*

RC *No not necessarily I think it could enhance or help in identifying approach for surgery or stent or whatever type of intervention that they might do, I think it would be, these are kind of one dimension, one plane if you like and it is actually haw I would imagine what that would look like in the body all joined*

up together but when you see it there you can see if quite clearly and I think it would help in surgical planning, I think the integrity of it is good

J *Do you think it has been enhanced then?*

RC *I think enhanced to a point, it is enhanced compared to this one it is definitely it gives a lot more information perhaps if it was more 3D and you could rotate that image you would get even more enhancement of the information as opposed to, in comparison to access this has of the 3D scan but I think the integrity is good, I think it is enhanced and does actually it is preferable to just looking at the images like that.*

J *I'm going to just put up some other images and these are other viewpoints of the same piece of data but obviously the background are different, if you want to add anything to what you have already said*

RC *I think that does give a good idea of the relationship to the spinal column, also you get a better idea of just how large it is in a different plane in a different rotation, the way the lighting and things does give you an idea of just where it is bulging if you like, it is quite large, obviously pressure on the vessel you can see the renals coming off quite clearly there on the right side, I think even in that, that is actually more enhanced than the previous image, it gives you a better idea of what is involved in the pathology, I think it is very realistic. This other one is similar to the first one but there is a difference you just see arterially more of what I would imagine calcification on there is you are seeing at the front there, it does look quite realistic and it doesn't look as flat at the previous image in that direction, I think it would give a better idea of just how the anuerism is bulging out arterially, I do think though the previous one rotated round does give better anatomical detail of the actual anuerism, just how big it gets at that point.*

J *In terms of its integrity enhancement?*

RC *I think it is a good, it is better than the original one, I think the integrity of it is good and the enhancement I don't know, I'm not sure what it is because of but it does actually look more enhanced*

J *And computer generated do you think?*

RC *Maybe slightly more but I think it looks more realistic, it looks realistic it does look realistic*

J *We are going to move onto a final set of images Wendy and these are ones taken of some blood flow. So I'll first of all put up a cardiac sequence, no the imaging straight ahead of you as you probably know is an MRI scan and it was performed at Perth Royal Infirmary and it is an image shown, a cross sectional lice of the heart pulsing and this is built to reflect a real time heart cycle but obviously as you are probably aware it has been acquired over several heart pulses or heart beats in the acquisition of the image so it is not really a true reflection of this particular heart but it is a representation. The image on the left is slightly more complicated and is consists of a variety of bits of data coming from various sources and obviously you can notice straight away there is a blood vessel there and that is taken from a renal angiogram it is taken from the original 3D data set that I worked with before so in that respect it is linked to data but the red blood cells, the*

movement of the red blood cells it is not actually a translation of any piece of data it is an interpretation it is my interpretation of how the blood moves based on information such as this image and discussions with the medical team and radiology and obviously as well the red blood cells are not again actually that size they are oversized and they are stylised to really heighten the narrative of how blood moves through the body rather than to actually represent it so in that respect it is again interpretive so the first questions I want to ask you is first of all what insight you feel these set of images offer and how would you describe their visual qualities?

RC *Well the heart imaging I think shows quite clearly the mechanism of how the heart relaxed and contracts to push the blood out towards the rest of the body and you can see even in this that blood doesn't always just go in one perfectly straight line it swishes round the heart and it is actually a very clear image and*

J *You can see the heart valves?*

RC *Yes very clearly and you can see the heart valves that have to open and close to let the blood through and the pressure building up in the heart and the heart muscle myocardium contracts so I think that is a very clear representation of how the blood is circulated round the body from the heart and the movement of the blood into and out of the chambers of the heart, it is a clear image it is very clear image, although you can't actually see the blood vessels, what blood is made up of, you blood cells. On the left it is very good, it is showing, the way the heart beats, the heart beats and contracts to push out the blood it is in the same sort of pulsing action on the animation there which shows people that blood doesn't just flow all the time in one direction through the blood vessels they are obviously hitting off the side walls of blood vessels and that is very clear to see on that it also looks as if it is spiralling round which is a relatively new concept, blood doesn't just flow in a straight line it does torque and twist and turn and hit off the walls of the blood vessels and I think although the blood cells are, corpuscles actually are oversized but it does give a good idea of the movement, if you had them to scale then it would be very difficult to see the actual movement or how they perceive the movement to be, that fact that you have got a very clear transparent vessel, although you say it have been taken from true data so you know that these vessels are in that position and that is correct and I just think it is excellent and I think that the visual appearance is, the integrity I think is good, I do think it is good*

J *So you think in terms of its integrity even though it is not made up of, it is made up of different parts of data and there is a high degree of interpretation it doesn't really affect its integrity it still tells a story*

RC *Yes it does*

J *Maybe not a story for diagnosis but a story of blood flow*

RC *Not necessarily pathology but it is giving dynamic information*

J *So do you feel it is an enhancement of all these bits*

RC *Bits, yes*

J *Okay the last set of images I want to show you Wendy are some stills of this, I want to just show you a couple of still images these are the last two images and then we will just have a chat and another biscuit if you want one. Now these are kind of two extreme images, one is a aorta, one slice from an MR scan and the other one is inside the aorta and has highly stylised computer generated imagery and I just wanted you to sort of comment on both of these images Wendy in terms of what insight you feel they give and what qualities they have and obviously feel free to make any negative comments?*

RC *I see that as one image showing the blood flow down the main aorta although you can't see any moving blood because it is not moving it is not on a loop but I see that as a very clear image of contrast rather than actually blood flow itself it is a flat image it is very black and white, it doesn't really give anything two diagnostic, it depends on what you are looking for but all you can tell is the main abdominal aorta has no disease on it but as far as that is you can't tell of any other anatomy and you can't tell certainly dynamics of flow, it is very black and white and it could be anything*

J *Someone said it was like a satellite image of the Amazon*

RC *Well it could be. On the left I think it is a pretty picture, if I didn't know that these were mean to be red blood cells I wouldn't know what that was at all, I wouldn't know that that was blood cells within the aorta although it is very, it s an aesthetically pleasing image, nicer than that one but it probably gives as much information as that one, I don't think it gives*

J *They have both got similar authenticity or lack of it*

RC *or lack of it*

J *Maybe an ambiguity a bit ambiguous I suppose*

RC *Yes that is right you cal only perceive what it is meant or try to perceive what it is meant to be or guess what it is meant to be but I don't think, it doesn't give clear cut imagery at all, I think it is*

J *I'm going to put one more image up and this is the last image and again taken from the renal artery data that you saw at the very start of the presentation and this is showing the stenosis and I just want to you describe the visual qualities and what insight you feel this image offers and how you think of it?*

RC *Again I don't think it because it is quite flat and you know that that is connecting the wee blood vessels but the cells within the aorta or in a blood vessel but it doesn't give the same realism as some of the other images, it does show that there is blood within that vessel but it could be the Amazon as well it doesn't give I don't think anybody looking at that would know exactly what that was*

J *So you feel it is a, what do you think about its integrity and enhancement*

RC *It doesn't really, well I'm not saying that the whole outline of it isn't a real blood vessel but I don't know if you could, I don't know if it would enhance what we would see already from this*

J *In terms of context we are in now how do you think it functions in terms of not in the hospital and it is a stand alone image*

RC *I think it is nice, the way the light is reflect you can see the transparency of a vessel or whatever it is, things flowing through it, it is a nice image*

J *There is no right and wrong answer to this, say what you think it doesn't*

RC *I still think that compared to other images it is just, it doesn't describe to me what it is really but it is a nice, it is a pretty picture and you see through the blood vessel and you see the blood cells but to me it is as obvious to me as that would be to somebody*

J *We are going to talk a bit about the origins of the images because you have looked at it but I kind of call the end artefacts these are the end images that I have produced from the radiological sense and the 3D sense and I want to jus talk a little bit about this notion of integrity but I want to show you some of the work that we have got here, just to give you an insight into the process that produce these, so basically obviously the process I go through it not just a translation process of the data it is not just like a mechanical process there is a kind of high degree of interpretation and where does all that come from and how does that affect the integrity, well in one sense this has got anatomical, so you have got images, you have got, I have to read about the anatomy to really understand what I'm looking at and obviously thee books will help but also there is a historical aspect to medical illustration or medical visualisation in that sense, and there is lots of things, there are lots of influences in that point of view, I mean I'm not a new thing I'm doing really, I'm just using new technologies*

RC *With technologies*

J *Technologies, exactly but also the process or mediation goes on between you and me and the staff in radiology so there is lots of emails to Trudy and drawings from Graeme there is lots of build up material that goes in to the process of translating the images so there is a collective thing, but also things that are slightly obscure and this is kind of critical to the process as well, because there is interpretation and there is a high degree of looking back at how other people approached, but even things like lighting the lighting that I've applied to the images is heavily influenced by this guy here called Vermeer who was a painter about four, five hundred years ago and his work, the way he lit objects was particularly sophisticated in using paint and that whole process of lighting objects in a specific way creating darkness and shadow and areas of interest is very much like I've been using in digital technologies to allow what I do because the technology doesn't allow you to, it doesn't provide any off the shelf way of doing it so you actually have to build this in these sophisticated things as you were saying with that which doesn't really have any soul to it, it is fairly soulless but other things as well that goes into the work is obviously where there is a kind of kind of celestial input, because there is a large amount of black in what I do, it is very much exploration, if you like an explorer and this kind of space orientated imagery that has had quite an influence on what I've doing when you see that through the images*

RC *Yes*

J *Where the building is just black and obviously things like this as well ?? and what geography, really do replicate a lot of the vessel structures that you would look at in the body, I mean things like that and things like that ??? they are not that dissimilar to the work that I do and this sort of stuff as well, so you can see how the visual aesthetics and visual language actually are much a part of it, how much art is a part of it if you know what I mean, it is not actually working in a vacuum it is actually*

RC *???*

J *So you see all the mix that goes into it but I just wanted to show you a couple of things on the screens if there is like a degree of interpretation in the work that I do has it got less integrity because it is distancing itself away from the science it is not reproducible it doesn't work in this domain that the radiology and the physicist work to, it is moving away to much more of a kind of subjective field, has it and I'm not asking it as a question but through the inter mix, for instance this is another image that was produced, that I produced of a pulsing heart and this is not taken from any data this is actually purely interpretive, I have actually just built all this from scratch form my own knowledge and working with Graeme and obviously building all these movements in but does that image have less integrity that an image that might be taken from the scan? Probably not for a patient does it, it has probably got more integrity because this is completely impenetrable*

RC *That is right ??*

J *There is something here that I wanted to show you which is from, and this is an image of the vascular system*

RC *Is that from an*

J *That is not from a scan no, that is all, I've built that all myself, this is a, it seems very bizarre but this photograph that I use I took at the Natural History in New York, this picture of a mammoth and it is a really interesting shape and this is the 3D data I took from a patient and you can see the influences that go into producing the work but obviously there is this bit and slightly off the wall, but they bring the elements to this work, they are using the language, so maybe if I, given you that context I'm just going to ask you a couple of questions and then we will call it a day, so the first question is, what do you define as visual integrity in your own practice when you are dealing with images, what would you define as authenticity and integrity?*

RC *In my practice is producing images that are realistic because although we do take pictures of patients you can actually take images that look like nothing like the anatomy that you are trying to produce depending on how you actually scan then, you can scan them in different directions they have not got any sort of relevant anatomy at all, so I think from the reproducibility I think we need to get good anatomical images to help with the, see the anatomy as a whole if you like for the radiologist to then make the diagnosis so I think there is a responsibility on us to make these images as true as possible and that comes with training and experiences and skill and all the rest of it, and also knowing, you have to know the anatomy before you can actually produce the images that we have been asked to produce, we have been asked to produce images of a tendon or a muscle group you have to*

know how that muscle or how that tendon lies in relation to the rest of the anatomy so integrity is an important part of producing these images I would say, sorry what was the other thing

J *No that was fine, you have answered it perfectly and what role do you feel, this is another question, what role do you feel artists should play when working with medical scan data and I'll give you some words that have been used, somebody said translator someone said mediator and some other people have said illustrator and these are all kind of words, I mean based on the experience you have had working with me and the work you have seen what do you think my role is?*

RC *I think probably your role is to take the true anatomical information, put your slant on it to make as realistic as possible but to know the anatomy as well, to know because it could be so easy for you to computer generate something that isn't quite authentic really, isn't quite real and*

J *And makes something that is fake but they are making you do them*

RC *That is right, so I think what you have done is taken images, sort of bog standard images to us if you like and made then alive really, made it, just put it there but without doing, I mean you have enhanced it to the point of making it easier to see and to visualise but you haven't sort of made it look so good that the pathology is gone and you haven't put your own interpretation on it on as much as that doesn't look so nice I'll take a bit out here and it is not a true image, it is a true image but it is more realistic, not just to patients but I think for us as well, it is good actually to see the images that we have produced actually look and how it looks in real patient because unless you have actually done dissections on patients with a lot of pathology you don't know if that is what is looks like or not really to be honest*

J *So it is almost like I'm building accessibility into the images, it is building an awareness of the reality of what it is rather than, but not too real as you don't want blood and guts because it makes it equally, it is almost like you have got MR at one end and the actually blood and guts at the other end, you don't want either of those things in some ways as the MR is too*

RC *Too technical, yeh*

J *Too technical and the blood and guts is just too realistic and there is the sort of middle ground between the*

RC *Definitely and I think what you have done has got that middle ground and it has not made it too gory for patients, staff or people who are working with these images, I think kit has made it very, I think it has brought home exactly what it is all about really*

J *And this is like in a question that I have been asking everyone but probably from your point of view, being exposed to the medical stuff you can probably hasn't changed, but do you feel the images that you have seen today have affected the way you feel about your body?*

RC *Yeh I think it probably does actually, you can imagine what you are doing to your body when you do this, that and the next thing and if somebody said oh patient has a renal artery stenosis, what that actually means in the way of*

what treatment has to be done, what it looks like when it stenosis, it is not just a case of the patient has high blood pressure, what is actually means, the blood vessel can actually be blocked off all together and I think it has made it more realistic I know we have all done anatomy and all the rest of it, and again maybe apart from a lot of medical like doctors who have actually worked on dissections, to us it is still just a flat image in a book or looking at maybe a 3D statutory 3D model that you take apart in a classroom but it doesn't give you the actual animation, the actual flowing movement of a body

J *It is probably soulless, it is fairly soulless and fairly inanimate*

RC *Yeh that is right*

J *You want to being kind of soul to things as the tissues are alive and I suppose that is the interesting thing about you guys working in MR as well because you get a chance to see, it is not pathology in the sense that you are looking at things as afterwards when they drain the blood, you are actually looking at them in action in one moment in time which is something, that is what I find quite interesting as well that you have always got a wee looking glass into this world that no one else sees and when you try to explain to someone what you do I'm sure you say 'oh I work in radiology and MR and a bit like x-ray' and people say 'oh right' but they don't realise these kind of landscapes and places that you go, you go to places that no one else can go really*

RC *That is true, I mean ever since I started working in MR, I've thought that often, thought gosh I know so much more about anatomy now than I ever did before even as a radiographer taking x-rays and things but because we are seeing it every direction possible, you know*

J *And it will continue to get better wouldn't it?*

RC *Yeh as technology improves and things, you are not just seeing it on one plane you can look at it in a different direction or different direction again, like your synase of the heart you can actually see the muscle of the heart contracting and I'm sure that will improve as well and the other techniques that we will be able to do in the future*

J *I think what else is quite interesting as well is that everyone is different, I think there is a kind of gold standard of anatomy that every one gets taught but there is a gold standard of disease process as well, I'm sure of what we renal artery stenosis is but the actually reality of it is so variant and obviously MR, it is like me I take a lot of these images but they are so different all these different types of conditions and one 3D reconstruction of one is different from another.*

RC *That is right and I mean some of that anatomy there if you were doing the same anatomy in a child it would be totally different, it would look completely different it might look clearer, it would be different so it is different in everybody and it just makes you realise that it is a start off process of a child and how your anatomy changes and how disease process change and change anatomy and things*

J *I suppose it makes you appreciate though how complex we are and how*

fragile we are as well through these pictures, I mean in one sense they have like a hard nosed radiology would say it is just a diagnosis that is all it is for but there is probably a broader context to all this stuff that we all should see all this stuff and we all should have access, my Grannie should see really what she looks like inside so she can appreciate her 80 years, this machines has been functioning with her every day since the day she was born and there is all those kind of broader issues that in some ways when a radiologist puts up an image and makes a report they don't see the humanity necessarily of what they did, they probably can and because they are not trained to and it is not what they job is about and if they did they would never get the job done but equally it is probably what I'm trying to do in this work which is in one hand, because I said this to Graeme on the one hand you have got the one to one patient part of the project which is like I build pictures, or build animations that help Graeme and you and Trudy communicate with patients so they understand more about what is wrong with them and would hope that that would give them more confidence to ask questions and maybe give them a better wellbeing and that is admiral and that ticks one box and that is one aspect of the project but there is another aspect to this project, there is a much broader context, it is maybe what we have been teasing out today is that as well as integrity there is, these images function quite happily on a wall level and bringing lots of different types of people in, they are not just about one to ones at Ninewells they are about opening up the kind of discussion and debate about what happens inside

RC *That is right, tell it to everybody*

J *So it is almost like I feel I should create a book of images and build something to disseminate these things for people to see*

RC *Because I think the pictures on this side of the screen feel as if they are solely for medical staff but I think the images on that screen are for everybody, medical staff, public, you name it your Grannie whatever whereas to me that that is only as you say you can look at an image and think oh*

J *It is a restricted vocabulary*

RC *Yes it is it is restricted and not anybody would look at that and even with a wee bit of background you would look at that and go I don't know what that is but looking at these other images they would know it is a bit of anatomy they know there is something, a motion or a movement of a heart or a blood vessel through a vessel*

J *That has been great Wendy that is it all over*

RC *An example of integrity or authenticity of images is that on a patient recently vertrible angiogram like the one you represented with the loops of vessels the clinicians had decided the patient had a blockage of that vessel a dissection of that vessel but in fact on re looking at the images taken what had happened was that that the person that had actually carried out the scan hadn't actually covered that part of the anatomy had a variation in their anatomy so it was really clear that you need a bit of experience of you need a bit of*

J *It is a craft you learn and it is accumulated and I think you said it starts accumulating through time and so the images are never absolute, there is very much a human intervention and the instrumentation is just like a camera lens, sometimes you get great pictures and sometimes you don't it is the cameraman that makes the pictures not the camera itself*

RC *That is right so although these pictures are very pretty*

J *So what happened to the*

RC *I think they re looked at some the other images and the patient was actually fine but it just goes to show that*

J *Pictures can l ie*

RC *Pictures can lie if not done properly*

J *Because the patient had a really ??*

RC *Just a variation in her anatomy and it wasn't obviously that clear and it could have resulted in a different treatment for the patient*

J *That is really interesting isn't it*

2.13. Designer B

Interview with Designer B
Date: 23/10/06
Time: 09.30
Duration: 1:31:47

J Basically the way this is split is that I'm going to put up two images simultaneously so on this side this is all the scan data they are all the images that have been collected by the scientific equipment and on the left here these are the reconstructions that I have subsequently built from that and what I want to do is put up two images in sets and we are just going to discuss some of the content of those images but I will give you an introduction on context to what is each one so that you are not looking at them completely blind. So we will just start off with as you can see they are split into four key areas one of the artery, the kidney and the anuerism and blood flow so we will start off with artery, there is a lot of navigating between the image so just bare with me, so I'll just explain to you Hazel what is on each set, each screen, straight ahead of you on this screen this black and white image is an MRI scan a magnetic resonance image scan and it was taken at Ninewells in Dundee and if you are not aware the magnetic resonance imaging is a diagnostic process where they will put you on a table and they will put you basically a plastic tube which is a giant magnet and you will sit in that for about 45 minutes

DB Is that the one that you get passed through, yeh

J And what they are, they are primarily a diagnostic image as they come out of this and this is one type and these are cross sectional images the beauty of the MRI is that is provides a sort insight, it produces slices of the body and it is not an animation as such it is a sort of freeze frame that then chop through the body

DB So it is kind of time lapsed?

J Well it is not actually time lapsed at all it is almost like you have got a patient and you have put them through like a bread slicer but not long ways but sort of if you can imagine you can pick out the basic anatomy there, that is the head and the neck

DB So it has been done longitudinally?

J Yes exactly

DB Okay while the patient is absolutely still and it is just

J Exactly and the white parts to that promotes the low white areas are the arteries and they have areas of high signal they call it and you can see it as it moves up to the head and neck and these are the areas of blood that supply oxygen to the brain. So on the left here is the same piece of data that has been reconstructed in 3D obviously it based on that data and it is used the shape and outline of that data to generate this but obviously there is a degree of interpretation because it has been lighted, colour and some degree of texture

been added to the geometry, in addition to that there is also various series of camera angles set up here so you are panning on the same object from a different perspectives and that just loops for about ten seconds. So I'll leave these up for a few seconds and then we can, maybe you can let me know when you are ready for me to start asking some of the questions.

DB Am I just looking at it visually or am I trying to understand

J Whatever you feel, I mean it is a bit of both really but what I'm interested in is gaining your perspective from your own professional practice so obviously you are not coming from a medical background so you will look at it differently.

DB Although you can't help looking at and thinking oh what is wrong with that it is the sort of pathology of that. Yeh but ready to answer questions.

J Okay I think the first two questions are related to I'll ask them together and we can go through so the first questions is describe in your own words these images and what insight they offer to the human body

DB Both of them?

J Aha but you can start with one and move onto the other or you can make comparisons and work you way through them both together it is up to you and then describe the visual qualities of each of the images?

DB Okay the first one I don't really understand what is going on but I do understand it is related to the body and I think I can locate it within the body because you can see the head shape but beyond that I don't really understand I wouldn't have guessed that it was anything to do with blood vessels necessarily but I know it is located within the body because I can see the body shape. The other one because I know it is arteries and because I have that image there I can locate it within the body but on its own I couldn't but in terms of understanding what is going on and in terms of it being a 3D object that is much much clearer. I suppose my question about it would be because it is body related it is very odd to see it on that size.

J So would you describe that as one of the visual qualities do you think that it is an odd scale?

DB There is a strange to skill and I don't understand it but id I saw it in isolation I wouldn't know, I would make the assumption that is was something to do with the body because of the nature of it and also the colour but I wouldn't know where it was, it could be somewhere like the pelvis or whatever I just wouldn't be able to locate it but in terms of that I know where it is now I couldn't really I mean it gives quite a good understanding but much greater than that.

J And in terms of the visual qualities of each one how would you describe them or do you feel you have already

DB Well it is interesting because I immediately thought that was time lapsed photography because it seems to have a time element to it because it is changing so thats, I mean it is interesting it is visually interesting but it is actually inaccurate interpretation of it but it is quite a beautiful thing whereas this is very static and much more visual so yes it has, you know it is, well you would make the assumption that it is something to do with the body rather than

something from the ? well tree roots or anything like that, you would know that it was something internal.

J Another couple of questions which will continue on from this visual quality and will sort of define them a bit more, some of the other interviews have required some additional background to these questions but the first question is do you feel that interpretively the image on the left here has less integrity due to its abstractive nature or more and the question leading on from that has the artist enhanced or diluted it going from the 2D to the 3D, so the first question is orientated round integrity?

DB It is a difficult one to do with integrity to with aesthetics because it is actually about truth and communication and that is the integrity of the whole thing for me is actually is it true and is it understandable so yes thats true and much more understandable in many ways taking apart the scale and the fact that you can't locate it exactly within the body, this is a beautiful image but I don't understand what it is without it being explained so I mean I don't know medically about the integrity but I was assuming that is accurate and that is how it is, visually it is quite different but for me that doesn't matter it is about communication and truth so that has integrity because the information is much more understandable.

J Okay so you feel it is an enhancement from the image which was the start point?

DB Yeh, I mean there is things about it in terms, because this is a black and white image it kind of takes away from that visual nature of it and then that has been put back in there I don't know what that would look like if it was black and white.

J The 3D one?

DB Aha, because it has obviously been coloured to represent the colours of the arteries.

J I'm going to slow thing down and we are going to look at some statics I've got of the same piece of data and I'm going to ask some similar questions. What I want to do is I've got almost like a collection of four or five images here and rather than stop on each one I'm going just like pan through them all and then put them up for a few seconds and then we are going to stop on one particular one and these again as I said these are all taken from this piece of data but they are kind of static viewpoints and there has been an heightened level of interpretation has been added, additions to them in terms of the way it is viewed so I'll maybe just go through these and we will stop on one particular image and have a chat about that. So we will stop on this particular image and obviously for reference I'll keep the original data up as a start point and maybe we can start off with the first two questions which is what insight do you feel this image goes in to the human body and how would you describe the visual qualities?

DB Again I'm not sure where I am, the space located to that I feel that is actually located within the body, I find it quite confusing, I mean I think it an interesting image, I don't necessarily relate it to where we are in the body because of the texture of the two curls in the forefront it kind of gives a sausageie feel to it and because of the colour, I think it is the colour I find quite strange because it is obviously referencing something internal.

J So do you feel that the integrity has dropped then or do you feel it has changed in any way for the good?

DB For me it has changed, I'm finding it quite difficult to dislocate myself from how something looks and what it is trying to do and that is an interesting visual image in terms of composition, it is balanced etc, but I don't understand what it is and I want to understand what it is because of the context you are showing me, so yes I think it has dropped in comparison to initial image

J So there is a degree of dilution even though it might be more visually interesting it has lost its integrity because you can't relate it to maybe its origins?

DB Well I don't know what the image is for anymore because it is not telling me about that part of the body, it is not telling me about arteries any more.

J We are going to move onto another part of the body, we are moving down the vascular system, all these images are from the vascular system which obviously covers all the arteries, the heart and the kidneys so we are going to move down to the kidneys and I'm going to show you some images of the kidneys. I'm going to put up a sequence here now this again is an MRI sequence and I'll just give you some background and the images straight ahead of you again are a cross sectional and again taken from an MRI scan at Ninewells and this scan was performed from a diagnosis of a vascular condition call renal artery stenosis, this is a serious condition that occurs when the vessels feeding the kidneys become blocked or narrowed due to a build of arterial plaque and this may result in surgical intervention so obviously the central part here is the aorta the glowing white part which is going through guts or the kidneys and the kidney on the right in this particular condition you will notice a little pinch in the vessel that is bad news, on the left here this is a reconstruction of the kidney on the left our left a healthy kidney and digital lighting has been added and a degree of transparency has been put on this area and obviously a focus on the internal structures of the kidney again continuing on the questions I asked you earlier maybe you could describe what insight you feel this image offers in to the human body and some of the visual quality of each set of images?

DB I find this one much easier to understand than the previous scan and also because it isn't done through time is it, it is just slices again

G Yeh slices again

DB But you get the feeling that is through time you get the feeling that is pumping blood through because of the sequence of the slices and when you described to me that pinch that seemed very clear what was going on there so that is a much more understandable image than the previous MRI scan. This is showing something, I mean this is a beautiful image and suggests new life and other sorts of biological forms but it is not designed to show the same thing as that is it?

J No

DB No, but I think it is understandable and readable and certainly gives the impression of a 3D object, should it be that way round or should it be side ways

in the body?

J Well I have completely taken it out of that context, so you are right it should be rotated that way but to enhance the visual I've completely put it at three quarter angle and I've flipped it so effectively that would be, if that was taken from out that was someone lying on their side rather than standing up. So do you feel if you were comparing the two that this one is an enhancement or it has got an increase in integrity or the integrity has just changed?

DB I think is has just changed because that one for me is an interesting image and is understandable as it that one, enhanced to make it look like

J Based on the fact that there has been a degree of interpretation on the image on the left do you feel that in terms of its integrity obviously the MRI image is much closer to a specific scientific truth and when we move it across to more of an arts space do you think in terms of visual quality has increased although married things that are not necessarily real, do you think that affects it as well, it affects its integrity or do you think it depends on the context?

DB I don't think it matters so long as it is essentially true

J So if I was to add something in that wasn't authentic to the image it would probably distance itself

DB If you put on some extra arteries to balance it up or whatever I think that would change the integrity of it but if it is based on the medical facts I don't think it really matters.

J I'm going to put up another image Hazel here and this is same piece of data so I'm going to leave that up there and it has been visualised in a different way, now it has been visualised in a completely different lighting and I'm trying to tell a different story to possibly to a different audience this global illumination with a degree of shadow it is a very different texture and shading on the object maybe you could describe some of the visual qualities in this and what insight you feel they offer?

DB Well that to me clearly represents a three dimensional object and has the aesthetics of medical models that you might use to medical students to explain how things go together, I think it more clearly in a way, a sort of very blunt way explains what you are looking at, because it has that aesthetic of medical models you kind of expect there to be something grim about it, it also has that colour of bones and you kind of imagine there is something wrong about it, it is kind of presented in a very blunt way whereas the previous one was a beautiful object with colour about it but it is describing to me a 3D object very clearly but it is quite dead.

J And do you think that in terms of its integrity it still has a degree of integrity in relation to the original start point?

DB I am assuming that it is an accurate representation, I mean I trust it to be an accurate representation of it.

J So in terms of its enhancement or dilution or neither of those things how would you place it ? or is it unfair to make a comparison

DB It depends what you want to do with it because I think you understand what is going on from that, that is quite a clear image, if you are wanting to show the pinched piece on that you can do that as well but I don't know that it would be any clearer than it is there because it looks so much like a solid object there is that, in my mind and it is to do with the aesthetics of it but it is also just with experience, you imagine that in a kidney bowl so it has been taken out so there is something wrong with it, whereas you previous one looked like something that was alive so it could stay in the body

J We are going to move on to another set of images and we are moving further down into the body going from head and neck, kidneys and now we are moving down to the abdominal areas and we are going to look at something called an abdominal aortic anuerism which I will explain what that is in a second. So to explain what you are looking at, in front of you is, these are CT images these are CT slices this is not MRI this is a process called CT which is pretty much, it uses x-rays and again you go into a tube but it is a much smaller tube and these are cross sectional slices going down the body towards the abdominal area and the CT scan is of the aorta, the main artery that feed the blood from the heart and these are diagnostic images used in the detection of a condition called abdominal aortic anuerism which is a life threatening condition, on the image on the left here this is the same piece of data that has been reconstructed and although it has very little interpretation in the sense of there it very little colour been added and it has been rendered in the most basic format so it is the process of the three dimensional from the two dimensional that can be achieved from the 3D in that sense, so maybe Hazel describe what insight you feel it offers into the body and some of the visual qualities of each set of images?

DB This one I find very difficult to interpret as to what is going on, that seems much clearer and then because it is located with the spine and the pelvis or whatever it is quite clear where it is, in comparison to the previous images you showed it seems it is not as dead looking as the kind of putty coloured kidney and it is kind of clear what the problem is but it doesn't have the same aesthetic qualities of the ones that are more like the sea life creatures that you could see through that had a life to them, but in terms of relaying the information it seems a bit clear whereas I wouldn't have got that from that at all.

J And in terms of the integrity of it how do you place its integrity? I suppose my point of view, well you answer it first

DB Well I mean I suppose I'm using the word integrity in terms of is it true that is my interpretation of it and yes I'm assuming it is true and I mean obviously this is absolutely true because it is taken from the patient but I don't understand it whereas this I do understand and I'm assuming it is an interpretation of that same information.

J yeh there has been very little interpretation in the sense of, in terms of digital lighting and it is moving and its texturing that has been added so in some ways, I mean you are right this kind of perspective on integrity and truth and the scientists will always look at a lot of these images and interrogate them in a sense of how true is it to the original data whereas from an artist point of view in some ways you add things that are not going to be about keeping if faithful to the original data, they are often trying to tell another story which moves it into another domain but does it lose its integrity, is there a mean integrity in the middle or maybe there isn't maybe it is just different contexts?

DB I mean they work in different ways, because obviously that is not the colour bone and how accurate that is to the colour of the anuerism but it doesn't matter because it separates the two and you understand one, and it is clear, it has, it is an interesting question, how appealing do you want something like that to be I mean the purpose of it is to explain to somebody what is going on but in terms of the artistic interpretation of it the ones that are lit have a sort of vibrancy and life to them whereas these are quite dead and cold.

J It is an interesting point actually because as an artist do you have a responsibility to get a life out a condition or something that is fairly ominous to use aesthetic language, visual language to enhance that or do you make it look beautiful do you make it look like something that you are stunned by it and how amazing it is when it is actually something, and in this case this thing, this anuerism is really dangerous and you don't have much and if this thing bursts you are pretty much dead so there is all those questions as an artist you have almost like an ethical responsibility to tell that story, well that is interesting. Okay we will move on tot he last set of images and these have a degree of movement in them and animation in that they represent something that is actually quite important to the vascular system which is movement and blood flow which often gets forgotten about and in exploring the anatomy the body's vascular system you often over look the fact that it is all about the movement of this liquid through the system which provides oxygen and whatever else, so I'm going to put a sequence up. So straight ahead to you on the black and white image, this is an MRI scan performed at Perth Royal Infirmary and this image is cross sectional slices, a cross sectional slice but it differs from the other ones because it has a degree of time lapse to it, it is supposed to represent the real time movement of the heart although in some ways it is actually a bit of a fudge because it is not actually a real hear rate in the true sense, it is not a recording of one heart rate it is a heart beat, it a recording of ten heart beats but because the machine can't keep up with the heart what it does it takes one at one phase of the heart and then lets the heart beat and then it moves it slightly on a bit so over the space of 10 heart beats it collect one heart beat, so it feels like it has got a degree of scientific truth and a degree of accuracy to it, in actual fact it has some degree of interpretation as well. The image on the left here it is quite different from the other ones in respect it consists of various pieces of information that have come from applied to one sequence so the tube that you are looking at here is taken from a scan it is actually taken from that kidney scan, it is the aorta and then the red blood cells have not been taken from anywhere as such they have been informed by this visually, so I've got a fell for the movement and the pulsing motion which has then been applied to a digital animation techniques to this sequence, the red blood cells are in the same boat they are again an interpretation as red blood cells are not that big and they are not that stylised but obviously to convey the message of the blood flow and how it moves through the vessel there is a high degree of interpretation so this image is almost very much a hybrid of lots of different things that tell a story, so maybe I could ask you briefly in terms of what insight you feel each set of images offer and the visual qualities in each set of images?

DB I can understand that one fairly clearly and I believe that it is in real time just because it seems like a heart beat and the fact that you have told me it is average over ten heart beats doesn't worry me at all it seemed right, if it was really slowed down or really speeded up then I would think that is not true but because it seemed like a normal heart rate I believe it and it explains something to me. This one again the pulsing thing explains the beating and the

pushing through because it is highly visualised and in a form of which we are familiar perhaps through advertising or whatever I'm less inclined to believe it, I'm thinking of the San Francisco bombs advert it is making me think of movement I've seen somewhere else or flocking birds or whatever or an advert and this sort of thing I've half expecting an advert for an insurance company to come up it is too stylised, I know it is a really from looking at it as an interpretation of something.

J So in terms of its integrity do you feel, how do you feel it has changed

DB I feel its integrity is compromised because it is too slick, it is too stylised

J So do you think the artist has sort of diluted from the original start point or enhanced or just different?

DB It is different because it a way okay you understand a bit about the pulsing there, it is moving and the red blood cells going through this and that bit works okay here but when it all starts coming towards you and becomes really complex and going through it that way I don't know what I'm learning from it or understanding from it and when it moves onto this one am I right inside the blood vessel here, I mean it is beautiful and it is engaging but I don't know whether it is just that particular, if you had done that level because it is kind of similar sort of rendering to the kidney that we have looked at

J Yeh same style

DB Same style but I didn't, I didn't feel like that about that but I think it is because it is animation because of the amount of movement in it and w are kind of used to seeing that sort of movement and animation in other places and films and TV it kind of, the integrity of it becomes the integrity of something that you know is manufactured

J Interesting. I'm going to move onto the last set of images or the last image and I'm going to put two up and so again these are two images of the aorta and here we have an MRI scan it is one particular slice through the aorta and this one is a 3D from that moving sequence and you have said quite a lot about the moving sequence and you may not have anything to add Hazel I terms of what you feel about these images but maybe you could just describe the visual qualities and what insight you feel they offer?

DB I mean that one I don't really understand what it is it could be a photograph of ?? plate or whatever or an image from a satellite it is just incomprehensible unless you actually explain what it is but it could be scientific you kind of believe it is scientific that it is, it could be thermal imaging in there or whatever you believe it is taken by scientific equipment and therefore it is true this one could be for high definition TV because it is clearly been animated on a computer whereas that I believe has been taken by some sort of camera and that one has been manufactured.

J I'm just going to put this image up here this last image and again this is taken from the data of the original kidneys there is this pinch the stenosis and obviously there has been a degree of interpretation again it has got red blood cells moving through, it has a high degree of lighting and specific ?? into it as well maybe you could describe some of the visual qualities and integrities you feel this image has got or not got?

DB I think this, I am more inclined to, I see there is more integrity, more, I can believe that one more because I can see the pinch and I could imagine that is animated that you can see there is a blockage there

J It is a still from that sort of moving sequence

DB So I imagine that could really show what you are trying to show, I think my challenge of the other ones was just because it was a beautiful movement thing and not actually showing something that is specific whereas because you can see that move and you get a log jam and so I can see the purpose of that and the aesthetic kind of put me off in the same way as the other one.

J Well that is the first part over. I've got four questions I want to ask you and they will evolve round this issue of integrity and I think we have covered a little bit in actually some of the questions that have been asked but what I want to do is before we just jump into asking these questions, I kind of call this origins table and it is just to give some insight into the process of building some of this work because I think that is inherently linked to how you evaluate things in terms of integrity you realise that something is made so you maybe attach a degree or less of a degree of integrity so I just wanted to maybe talk you through this and then it will maybe help answer some of the questions and what I'll do is leave some questions hanging as well and we can revisit them we sit down I mean basically when I build this work one of the first things that are done and it is more obvious than the medical illustrator have been done and have been doing for decades or centuries is this process of teaching yourself the anatomy, what you are looking and this is distinguished line of anatomists, anatomical artists who work in this field and they have all got very different styles but they do give you some insight and they do guide you through a stylised version of the human body to then educate you and that is the kind of starting point

DB I think that is an interesting point as well in that because we are used to seeing that the stylised anymore and that is true

J Absolutely and what is interesting speaking to the medics going through this process as well that this is one persons interpretation and apparently there is five or six different key anatomists that have a different interpretation of the heart because everybody is different, when you cut someone open it often doesn't look anything like this, it could do wit sex, ethnic background whether you are a child or an adult, how you live your life all those things influence the way, so it is like painting somebody's face an idolisation of the face and you can imagine the variations in someone's face so there are all these kind of assumptions and that really interests me but the other thing that influences the work is there is a degree of and I think you picked up on it there is already a language of scientific visualisation in terms of, a lot of the stuff that I produce has a degree of the science fiction influence on it this celestial exploration of the body and you can see the black that I use and it is almost like there is a sort of vocabulary a discourse in this language that we see every where now and these images are really good and something that is quite interesting as well that I picked up on earlier on was there was this kind of replication of the natural world and inner world that you these vessels that we have are no different from the way that a river delta forms and linking those two together has been quite interesting because there is a language of this as well there is an aerial but a visual shot and it could have been taken from a satellite but moving on from that, so you can imagine there is a degree of influence from a

kind of anatomical stuff, the illustration stuff there is a degree of what you maybe would call as contemporary visualisation of science almost and then there is the historical one which is a sort of continuation of this which is the visualising from the body since the ability to print and probably even before then so there is this sort of historical, when you think about Gray's Anatomy and so forth and it makes the image look pretty gruesome as well and yet a thing like this ??? it is out there so that kind of has an input but what is interesting for me is I think a lot of the stuff I do is about lighting and a lot is a bit of illumination and looking back to how some of the masters have used light particularly like Caravaggio which has been a big influence in my work and Vermeer and that has kind of helped me provide a series of ??? which is this series of images to produce the kidney using different degrees of digital lighting and I think this is something that happens, I mean you use a contemporary media like the 3D animation and you have the ability to, off the shelf you have a default everything looks like plastic it doesn't have the sophistication of something like a Vermeer painting or a Caravaggio and providing that kind of subtlest sophistication I think doesn't detract from the integrity it actually probably enhanced the integrity it tells another story that maybe needs to be told and then you have got things like this which is interaction with the medical staff it is a process of mediation you go through and you say, where is this and they will go and give you a diagrams and the doctors will often do drawings to explain how the heart fibulates and there will be lots of things flying back and forward so this is the kind of mix or the soup that goes around to develop these images that re not just a translation process of just taking the data and visualising it there is a kind of complex and I feel that enhances the integrity and it certainly changes it that is for sure, a couple of images I want to show you here Hazel and I will fairly rapidly go through this as I want to just kind of cover quite a lot of ground and then maybe you could give me your thoughts. This is heart data and this is an interesting aspect of the work as this the kind of pulsing and it is the continuation of that pulse work but I haven't taken any information from the geometry of the heart I have actually just built this all myself just from eye balling things and my experience so there is a question there is obviously if I move and I sculpt all this and then I eye ball the movement have I sufficiently distanced myself from the science so much that actually this has no integrity but I think it does have an integrity and it has a usefulness based on my experience and my ability to translate and mediate all this information

DB You see I completely agree with that ???

J You see that is really interesting because obviously people assume that is real or assume there is a degree of integrity to it but it is not it is a total interpretation of the star point and I use the language of science to try and enhance that. There is just one more thing that I want to show you here which is an image that I took at the Natural History, it is not a great photograph but it is an image of a mammoth with these kind of curving tusks and I kind of quite liked it for its symmetry but it ended up to form this particular image because obviously it acted as influence and I don't know where it was an indirect influence but it then made me think how can I set this image up, using almost like the language of photography, depth of field and so forth so adding really indirect links again does that move it away from the scientific world to something that is much more art space which then means the integrity changes so there is all these questions, ethical questions when you are working within a domain that has a scientific paradigm at its core almost it has this degree of reproducibility or ?? these are life and death decisions you are making in these

pictures, the black and whit ones but then when I change them and enhance them or I do whatever I have a responsibility in a sense, but them I think maybe it depends on context because obviously if is for a patient it is important that I keep authenticity and insist on being truthful but then if we were in an art gallery maybe it is not about truthfulness or is it, or that is another story.

DB I think it is difficult to separate the two because it is about pathology, I mean it is interesting that the guy that wears a green suit and went in through the

J Oh Gunter Von Hagen

DB I mean I've been to exhibitions of his work and it is obviously authentic because they are real bodies but then what has actually been done to them is his interpretation of things like exploded cross sections of bodies and things like that then moving things about but with this I expect them to be true and the one of the kidney going back it is a beautiful image but to me because it is the wrong way round it just doesn't sit right with me.

J Shall we grab a seat then Hazel and I'll ask you these last few questions, so hold some of those thoughts in your head because I think these are really important actually they are really sort of. So the first question is before we move into the work again is what would you define and I think you have probably touched on this a little bit as visual integrity your own practice?

DB I mean it is an interesting question actually because I've done work that has been to do with internal organs in the body but for example making the woman ovaries out of silk as a comment on women's position in Korean society and actually it was important to me that they were kind of the right size but in terms of actually being anatomically correct they just needed to be able to be read as a woman ovaries and they needed to be made of this particular pink silk because it represented Korean men's wedding garments and actually that is where someone could have argued that wasn't but it was to do with the woman's reproductive system as being symbolic of a culture so it wasn't actually going to be used for anything medical, so yeh I use the body or have used the body an awful lot in my work to the point of making mock ups of things being screwed into the bones etc so I'm talking about your integrity in what you are doing but my integrity hasn't been to the actual anatomy and the truth of the body it has just been to do with how you interpret it and maybe that is why I've been particularly pickie about yours because I haven't, I'm projecting what I've done in the past but mine is for a different purpose it is for people to go and look and think about the culture that they live in not to actually think about how the body works per say, whereas I look at this and I want to know about the body and I want it to be true.

J It is interesting because it is like in some senses it does boil down to what it is for like you say but the initial stages of this PhD and when I started to almost like when I wrote the brief which was the start of the PhD it was very much about this intimate one to one communication and this truthfulness of anatomy that existed between the doctor and the patient and that was almost like the design of the function of the project was for me to go through the motions to provide that tool but as the work evolved it soon became clear that there was a broader context tot he work and it isn't just about one to one action in that there is such a demand for people to gain insight into the body because science hasn't been the best at communicating it historically and if it has it is kind of blood and guts or highly stylised it is never kind of middle ground and so if we

are saying we are moving it away from this one to one although that is one aspect of the work where integrity is important but if you move it into a broader audience where you can have like that kind of as you describe like putty but that porcelain kidney the size of a double decker bus in Tate Modern you could image it is almost could this work move into much more of a broader art space context and give people insight into these kind of beauties and harmonies that goes into the body or is it just stay in this one to one interaction between doctors where the authenticity is important or can it exist in both, can you exist as both

DB I mean it would certainly generate interest in both for example the Ron Mook exhibition that was on in Edinburgh during the Festival the huge over sized human figures, people were absolutely fascinated by that because it is about them, it is about you as a body being huge and every hair is put in individually and it is about that real thing of being human although they are very static and like Michaelangelo marble figure has more life in it in a way than these things that are basically props like film props in the way they are produced but they are true absolutely true, I mean I suppose that is quite an interesting part of it, they are absolutely true to life and size and skin texture and cores but in comparison to a stone carving that has been done by somebody who somehow breathes life into they are dead, whereas what you are doing is kind of breathing life into something rather than your medical model where you put everything together

J It is giving it some sort of soul but it is more than the sum of all the parts I think it is important because if it is not and this is where I come into collision often with some colleagues who feel that I do is illustration but if it is illustration okay I agree illustration ha got its place but I feel that my work has moved beyond illustration and we are like breathing soul and life and if you are breathing soul and life and you are more than the sum of all the parts then it is art it is not just illustration it is not just and I think there is another question to be asked here and it is a historical question is that you kind of mentioned Michaelangelo and all these kind of famous masters from the Renaissance they worked for scientific patrons it wasn't science it was the church that was the science of the time and they had patrons they had to serve and so would we argue that Leonardo de Vinci was an illustrator, so there is all this

DB Well they used to have these arguments about things having been cast from life because they were so beautiful and so life like but if you do cast something from life it becomes dead whereas if you actually sculpt something and do something from your own interpretation and you way of looking at, as we are talking about these things here then that is when it becomes very alive, the kidney one being a real example of that.

J It is funny, I don't know if you saw the Caravaggio programme on Saturday they did a special about Caravaggio

DB I didn't but I'm quite familiar with his

J It was kind of fascinating because his work is so cinematic and so emotional when you view it and particularly that, as we talked about this aspect of using light and you see how dry and dead the artists before him who had kind of tried to breath life into sort of previous pieces of biblical tales and see how he did it and you just see this kind of night and day effect and I'm not claiming to be Caravaggio or Leonardo de Vinci but it is almost like I have got, I just have

insight into, because it is almost like the MRI provides a looking glass into this world that no one can see and I can see it and the scientists can see it but they have brought an artist and said come and have a look and I've had a look and thought oh my God I need to tell this story because it has not been told.

DB It is absolutely fascinating, it is really really interesting and now that you have explained it that way I kind of look at these images in a different, I think I talked about them that way in that the kidney does have this life to it

J I think the blood pumping one is another one that is trying to bring soul to it but it comes from both the artist and the scientists is this degree of authenticity and integrity and as consumers as we all are consumers we have been really well sort of founded in a visual language now through mass entertainment we have the discourse and language like you say the Sony ad and so people are not easy to fool any more and to breath life into something you have to do something really exceptional

DB And it is interesting going back to you picture of the mammoth from the Natural History Museum when I saw the one up there I was thinking Ice Age because I'm mediating it through something else

J That is interesting

DB Because of the image and the publicity image for the film is a mammoth and because it has that quality of having being CGId I'm actually not even thinking of the original one I'm thinking of

J It is interesting that the language of CGI as I think I have fallen into some of the aesthetic traps that a lot of CG artists do, I mean CG tends to be dominated by men of my age or young guys in their mid to late twenties and we are obsessed with Blade Runner or Alien and a gangsters and all CG seems to kind of fall into that loop and feel and it has that kind of everyone wants to make it look like Star Wars and so it lacks that sensitivity of like Vermeer or Caravaggio and moving it into a much more, asking much more profound questions rather than just adopting the language of something else.

DB But I think for me the kidney one if you turned it the right way round that is kind of what has got it for me because it is something that is true to what it is or I can believe it is a kidney or I would if it was on its side, but it has this light in it, it has this life in it but again it is how you are actually using something because as you said if you were going to show somebody's kidneys are about to fail this lovely looking image, should it look as alive as that.

J it is really complicated questions isn't it is really complex because some of the cancer doctors tell me that it doesn't really matter if you get the cancer cells right or the cancer tumour right because they just need something to visualise

DB It is that kind of doctors things, well that kind of thing tumour the size of a football it is that kind of visualisation of things or the size of a golf ball or whatever

J Kind of continuing on from that actually from that theme of what the artists role is a question I've got here is what role do you feel artists should play when working with medical can data, in this sort of context I mean I've put key words like translator, mediator, illustrator it could be all of those it could be another

word that I've maybe not thought of?

DB It is kind of like they are an advocate for the person's body really and yes it is about translation and illustration but it is taking something from this cold hard, because you can't, the MRI thing is you just can't understand because of the context because you don't understand because there is so much information but in a way it is taking the things and putting them in a understandable context in a way that is visually readable and I suppose there is a role for, if peoples visual understanding is honed by CGI and Sony adverts then that is a language that people understand.

J I think you are probably right, it is interesting maybe we have done this work from work with the patients and we have interviewed 20 patients and then we have been asking them, we have been two dimensional stuff, a bit like this experiment and we have added a narration to it, it was a voice over and there is a degree of editing through it and it is a bit like watching a documentary, there is two documentaries one is 2D and one is 3D so one is closely based on what the doctor would use at the moment and the one is based on this sort of language that I use this kind of high quality images using the flow but what was interesting and most of the patients were a bit older, they had renal artery stenosis they tended to be sort of late fifties early sixties and there was an assumption that they would really struggle with the visual quality and they would really struggle to articulate what they were looking at and thirdly it might be too much for them but what we found was the complete opposite and that they actually really engaged with the stuff and actually what they have kind of requested as an additional was having a question about what they feel could be improved and they want inter-activity or what they would describe as inter-activity could it be stopped, can it spin and can I have something to take home and so there is all these assumptions and one of the key things from this study was that they asked if there could be more medical information given at the same time so could there be a medical professional present because what they did at the end of it they asked lots of questions because now they have got the knowledge they can ask questions whereas they didn't have that before so it is almost like I know Seaton call this a sort of trust object, you are building a sort of object in between, the artist is providing an artefact to sort of mediate between all the parties present.

DB And it is also, it is such a complex inter action that is going on but for example, I can remember somebody explaining to me about a cancer tumour looking like a fig, when you cut a fig open it has got this and you can imagine that but imaging showing that to a patient and saying this is what your cancer tumour looks like they are going to be so shocked and horrified by that, that it is kind of going to stifle any dialogue so in some ways the fact that these are quite beautiful images and it is not an image of blackened lungs or whatever but an image that you can actually have a dialogue around, if it is opening up a dialogue then the fact that it is not absolutely gruesome and visceral is bound to help that.

J Yeh it is almost like you are providing, it is like a mediation between the reality and the data and all those things all mixed together because we had some stuff from a previous experiment we had like real photographs of the kidney and real gory and I'll show you that and they didn't really offer any, people found them emotional but it actually offered no insight, you have got the hard buy into it, that is not good news because it is almost like that is not how you want to see your body, you don't want to imagine it like that it is like that shock when you

see someone opened up in an operation and you are seeing something that you shouldn't really see and don't want to see and it is almost like providing something that is half way between the two

DB I mean this a very personal side but when I was pregnant and I had a scan done, I can't remember whether it was the 16 week scan or whatever and they said look you see inside the baby's head and you can see his heart beating and I was thinking it is not my business to be looking inside his head it was like too much information, it was kind of all right to see a scan to just say there is a baby there or whatever but to look inside the baby's head seemed intrusive but it was just to do with how you interpret things, it wasn't like you were seeing in you know, and that is like looking at it as a metaphysical space rather than a physical space but you do just interpret data in odd ways when it is about a body.

J It is interesting that whole argument round those ultrasound images that the scanner company has put all this stuff on the ultrasound images, Philips I think are one of the big players in this and they have, you have probably seen they have three dimensional ultrasound as well and they have got four dimensional ones which allow you to track movement but the actual images that you can print off and take away the doctors see no value for that and that was added just as an extra at the time, it was just throwing in, there wasn't that process of like analysing what patients wanted it was something that they thought would help the doctor when they filed the patients information they would have an image to go along with it and now it has become this massive thing that everybody wants but the doctors still don't value it, they still don't see it as it is a diagnostic machine and those are diagnostic images so in actual fact there is no aesthetic filtering process at all in those images they are almost like pictures to help them make a diagnosis they are not actually images to make you feel better about seeing you baby inside but that is what they have become almost, as people want them, they email them and they kind of use them as a mediation process about the pregnancy but they are diagnostic images, they were never designed

DB I mean I've got in the photograph album of mine it starts off with the scan and I mean it is crazy but it becomes an aesthetic and everybody can read a scan now

J And people see things that are not event there, that is such and such and it is not and it could be an artefact of the scan as it is just measuring dopler density of the material it is like we did this with the p earlier in the week who work with the equipment I mean they are at the real cutting edge of the science and they were saying that you know John all of this is an interpretation that there is no truth in the MR image either, MRI images are providing proton densities, now you cannot see proton densities so that isn't even a true reflection of the kidney, equally that is the proton density and sometimes a patient moves to cause an artefact which is not even, it is something that is invisible but it shows up on the scan and often artefacts can be mistaken for things but that is what the medical doctors are trained to a sufficient level that they can filter out the artefacts.

DB That is interesting, and the thing that is not actually there is it is just a blip is called an artefact, interesting.

J I can probably show you but if you notice on the pelvis data of the aortic

abdominal anuerism the big bulge and you see on the pelvis there is lots of pitting, that is not actually there that is just to day with the way the x-rays have hit the and been absorbed and some of them have bounced back so you get an artefact and that cause that surface texture but that isn't real so there is this whole issue

DB Yeh it is because you look at, I mean when I was looking at those images and I was saying it could be a thermal image or whatever, and a thermal image it only shows a very partial view of anything but you believe it is true because it is a scientific image

J It is hard not to, I mean I fall into that camp as well and I often and I think that is part of the reason I performed this experiment and par of the reason I'm doing the PhD is what value do I bring as an artist because I often under value myself and I always think well what I'm doing is very much touchy feelie and it is providing pretty pictures but the real clinical stuff has been done by these physicists and these clinicians and radiologists they make the life and death situations they make the images that make a difference I just make pretty pictures or I make pictures that allow them some degree of navigation but I've often found it is the other way round that it is the scientists actually see real value to what I'm doing because it is so limited their images are so limited, they only provide diagnosis but as we all know illness is not just about the nuts and bolts, it is not just about you are ill and this whole process of mediation when you are in the diagnosis process is being given and you tell someone they are sick, all the chain, the knock on effect after that is really difficult because you have got things like you have got to offer them there could be series of medication they need to take so they may have choices, there may be like a surgical intervention needs to be done, they need to make decisions on which one they need and they need consent from the patient and often when you give them complex medications, are they going to take the tablets and even if they do take the tablets are they still going to go down the pub and have their 10 pints and their fags every day and so there is all these

DB It is the thing about informed choice because I know a number of people who have recently been diagnosed with breast cancer and because there is such a variety of what they do, if it is a lumpectomy, whether you have a mastectomy whether you have a reconstruction done at the same time and the only knowledge people have is by talking to other people who may have a completely different form of breast cancer who maybe need their lymph nodes taken out or whatever but it is kind of misunderstanding and they are having to make decisions about

J I know and there is a huge debate about all the different drug therapies as well because some women are responsive to different drug therapies and often it is an education process in that and obviously medics don't have time to take everybody through and they go on the internet to find out information and that is completely not vetted although there is some really good webs sites now

DB Well it is interesting because my sister-in-law was diagnosed and had a mastectomy and reconstuctive surgery recently and had the type that was going to most responsive to Hercepton but Hercepton wasn't licensed and the doctor then told her that it was best that she didn't have the Hercepton and then they licensed it and then she got put onto Hercepton so there is all this kind of different things but she actually get treated at home with it because it is like 30 miles to the nearest hospital and she really misses that because she

doesn't have the conversation with other patients who are undergoing, it is not quite chemotherapy Hercepton but that sharing of knowledge amongst other people with the same condition is quite valued rather than just being separated out and given the drugs it is not just about a person on drugs it is about understanding the whole illness

J Absolutely, there is a web site that there is a couple of research papers came out a few years ago that identified what you have just described that this kind of sense of community and sharing of conditions and this feeling that you are not on your own there is a good web site, if you type in Dippex into Google, Dippex they have been developed from some work that spun out of Oxford which is basically a web site of lots of different video diaries of lots of different people's with all different types of cancers and different age groups and then obviously I think the spin off from that was various different communities have formed, virtual communities, I mean it was something that I was interested in at the start of my PhD is building this sense of community through sharing people's experiences through a kind of gaming environment but I moved onto this stuff and it didn't really get off but there is a huge demand for what you have just described as a feeling that you are part of something, because a lot of treatment is palliative care as well it is not all silver bullet and so having a feeling that you are not alone and it is being managed and shared because the system is under so much stress as well there is not time to, the Maggie Centre is really good for that, there is a lot progressive work going on in Dundee where they are trying to move things out of hospital environment and get discussion and not just for patients but for the families particularly partners and things there is often the relationship can maybe be under a lot of pressure and there is no where for them to go an find out particularly if your wife is ill and you don't really understand you can go an talk to someone away from the hospital and maybe not with your wife to find out a bit about what the disease is and it is manned by medical professions so it all boils into this medical, gaining some insight from the professionals.

DB But I suppose, would you image that people would get an image to take away with them in the same way as you get a scan of your baby?

J I think what my project does, I think I tell you what is happening the way I see it is there it two streams to this, one stream is that the medical scanner companies will wake up with type of work to the fact that they can't just produce diagnostic images that they have to build something in selling in the self scanners to hospitals they have to take into account patient information and communication and they have to invest in that, at the moment they don't and they are huge multinationals and they are bigger than some of the drug companies so they are huge companies and they just buy you if they think you are a threat and if we can wake them up to the fact through this type of work showing that really high quality visually interpreted almost like art space images have a value, they might invest in how they might achieve that in real time as at the moment what I do is achieved through a long process of rendering, colouring in some of this stuff but maybe w can help inform both these scanner companies and the NHS trust that they must invest in people like me within clinical imaging that there is a place for a medical artist in clinical imaging in both enhancing images and improving communication between and so I see my work as more of a holistic thing rather than saying where is the intellectual property in this, is there going to be like a, is there something that I can build into the scanners, it is actually not going to be like that it is almost like a consultancy type of thing that I could provide to say we should be making

images look like this, we should be providing a suite of tools that can help a patient understand so it is not necessarily the same as like here is an image take it away of your tumour it is like here is a suite of tools that can allow you to explain what a tumour is and relate it to the scientific data, as the scientific data will always say this is the tumour and will have those two dimensional images up on the screen and they may have some three imaginal images that the scanner will generate but running parallel to that and this is what it is about, this is the story that goes with this, do you know what I mean and I think it is the, you have got the high quality of 3D graphics, you have got the two dimensional and some three dimensional diagnostic stuff and they will get closer and closer as the technology improves until the point where they will overlap but at the moment they are not overlapping so as along way of answering a kind short question

DB Is there any kind of way or is there any value or would patients find because the things I was talking about was to do with context and things and when you see the anuerism or whatever and you can see the pelvis or whatever and it is only because this is the way I work myself that actually the way a doctor holds up an x-ray or whatever and you can relate that x-rays that actually you could project things onto people so they can actually see this is exactly where your, so you have got that image, they dress up a surgical gown or whatever or something that you can project onto and this is where your anuerism is exactly there sort of rather than see it on a screen so they get a real, it is related to them

J Yeh I could see a situation with that but even you get full body MRI now as well you could have a three dimensional representation of their exterior which you then start placing these parts on from the scans and from some other stuff that might be another way of doing it, I mean you could imagine, I think you could imagine within our lifetimes a situation where you will walk in and it will be like a room like this where you will have really high quality projections and there maybe a patient information health professional that deals with your questions that the consultants make the decisions but there is almost like a consultation where you can ask questions, the family can come and you can visually be navigated through your own body space and you can be brought to the point, it is a bit like that James Bond thing where they bring up the head of Robert Carlisle and they show where the bullet went and it got lodged in his head

DB Oh I've not seen that

J There is a bit where they bring it up, it is almost like this kind of three dimensional thing that they bring up and you say this is where your, I mean that will happen and I think it has to happen but it is all going to boil down to money and investment

DB I don't know whether it is something that people would find desirable, the thing like when you are getting a scan done when you are pregnant and you see it up on screen and it is all in real time that is okay because it is kind positive but would you actually want to see you tumour up on real time, probably not.

J It is funny there was a paper published last year which was really interesting and if it was true it will, again it is really, it points in the right direction from my point of view in terms of this work but although it is a slightly different media but they got, I think in Australia they got heart patients, patients with heart disease and angina and before they went in to get a scan on the heart to find out what

was going on they got them to draw in different ways how they felt their heart was so they got them and I think they got some templates to draw on and put crosses on and shade in parts that they felt the heart was broken and the drawing were actually much more accurate than the scans

DB Oh really

J To reflect the state of the heart function because they could feel it they could feel the pain and they could fee where it was roughly and so spending all that money on this really high tech scan in actual fact they could just draw out and it is almost like a two way communication has to go on, it is like you can show them lots of stuff but they have to feed back there has to be a, and before and definitely my folks generation, my mum and dad they are very much oh that is the doctor you listen to the doctor and he was the boy that went to the Grammar School, he was the boy that kind of worked his way up and he knows everything and he went off to Uni and

DB You don't challenge it

J Yeh exactly and I think now we are in a different game, people don't trust health professionals and I think a lot of people have a general mistrust of the health professionals just based on press, I mean I don't know what you feel Hazel but this is the feeling I get is people are much more willing particularly people like ourselves who have the benefit of education are keen to ask lots of questions and I heard an interesting thing, you can spot the class divide often by a patients notes and the level of education because people who you know, white middle class, well educated will ask lots of questions, demand lots of things so their note will expand and people who maybe, I mean it is a gross generalisation I think and it is probably not that reflective of reality but people who tend to be, their demographic is slightly lower, lower education from probably slightly areas of poverty, housing estates and so forth will not ask as many questions, will generally get sick.

DB Well it is interesting actually as I've got an Mdes student that I suggest come and see you last year she is finished now but I don't think she ever did because her project kind of moved in a slightly different way but she did a project with midwives in Peterhead because they get a lot of eastern European and Russian women coming and giving birth there but there is a language difficulty so she is an illustrator well she was an illustration student for a start and she produced a book as a kind of probe which showed, which was illustrations of things that women might experience post natal for example where their stitches were and this type of thing and how much pain they were feeling but all done by illustration so as it could be done without language and then gave it to the midwives to test as part of the project and it was interesting because her illustrative style was quite a loose illustrative style but it was moving away from using actual medical photographs or whatever and she got quite a good feedback on it, she didn't take it any further than that but it was quite an interesting project and she is still around

J You should get her to, as that is the kind of research that is really interesting especially up the road at Ninewells if you can get your foot in the door there, there is money available to expand into PhDs and the Art College I think PhD is seen as well you are doing a PhD but up there it is not, it is like if you are doing a PhD up there is like doing a degree and they have got lots of funds and they are really keen to bring I think the ones I've discovered are really to bring, I

mean I've got contacts in the school of nursing and midwifery and could put you in touch with.

DB This is why I kind of suggested she get in touch with you but then her project kind of moved, well it didn't move into different ways, it is all current, I mean she sees herself as being a kind of facilitator in social design but lots of other things, I mean other ideas she had done for example were like bras which inside had illustrations of how to examine you breasts but done in an illustrative way to kind of remind you when you are taking bra off that you should perhaps do a breast self examination and lots of things in her project were actually medically connected.

J I know exactly who she should speak to and who is trying to build up basically a whole image perception unit, not in the school, it is school of nursing it is a guy called Dr Brian Williams, I will forward you his email

DB Well are you going to be here, I don't know whether she is based in Aberdeen, she has been teaching, well doing tutorials with this years Mdes a day a week and she just finished last week so I don't know if she is around but it would be good for her to come and talk to you when this is on.

J Well there is two things happening actually that she could come and see, basically on Thursday night we are having wine and nibble here just as a closing of the experiment and on Friday it is open to the public all day between 10 o clock and 5 you can just walk in and I'm going to put on a looping animation and will have stuff on the table here to read.

DB But what probably would be good if she came and talked to you and maybe brought this to show you what she has been doing

J Absolutely, absolutely

DB have you got a phone number she can contact you on?

J Yeh I'll give you it upstairs when we go out Hazel I can't remember it, it is one of these new stupid numbers the new IP phones, I will give you it on the way out, but Brian is a really nice guy, I mean he has already done a studentship with some master students from the undergrad from the animation undergrad , he got money to do a studentship but it was based on cardio vascular disease

DB What is his name Brian

J Brian Williams

DB And he is at Ninewells?

J Well he is at the school of nursing on early pale but he has also got an office up at Ninewells in the McKenzie building but he is a really nice guy and even if he couldn't help he would put her in touch with someone that might be able to give her some advice, I mean there is no guarantee there is funding but the medics are always interested in doing stuff

DB I mean she is interested in doing a PhD but she kind of sees as it more this transformation design facilitation or whatever but actually the work that she has done is so interesting

J Well it is not a million miles away from this

DB No it is not, it is different but it is

J It is basic language, I mean I'm using that maybe rather than traditional illustrative techniques I'm suing sort of contemporary digital techniques but at the end of the day if you bare it down tot he basic of it it is still about distancing yourself from the reality and using the medium that you work in to communicate really complex issues that often if you present people with the real, even close to the reality of it they wouldn't be able to deal with it and navigate there is too much information and I can imagine in what you describe is a kind of gynaecology issues and all those other issues that would obviously be too graphic to present in one way but in another way there is a really goo paper actually which I can give her as well which was published, I used it in a transfer document, I'll look out the reference, it was done in New Zealand where they had a similar problem where they had a lot of indigenous people who couldn't in a part of New Zealand that had low literacy levels so they could read and write but at a really basic level so you would give them leaflets and they wouldn't read them so they provided pictures and they provided a DVD and what they found was it really enhanced their understanding of what tablets they should take so they took them

DB But it is that whole sort of thing that if you design for people that are going to have less, whether they are movement impaired or whatever it is going to work better for everybody, I mean it is the same sort of thing, I mean going back to personal experience as well I used to laugh at lectures when people hadn't written their report properly and the lecturer would say well I gave them a handout on it and it was after I had my son they gave you a leaflet on how to breast feed and it is the last bloody thing you are going to do when you have just got a baby home is oh I'll just go through those few pages of A4 to read that but a video or something like that would have made a huge amount of sense but it is like you have just had a baby and just chucked out of hospital 12 hours later you are not going to sit down and read a photocopied bit of A4

J It is unbelievable

DB You lose it with everything else but if you have got a DVD or something or a video you would

J well that is what we are trying to do in radiology because the money that is spent on leaflets in the NHS is enormous, I mean they literally have pallets of leaflets every month delivered and the honestly are as high as that blackboard and they come in and they get put in the store and they have leaflets for everything and it is all about, I mean they have obviously got their lawyers in the NHS to look at, it is all about risk management you give someone a leaflet and somewhere in the small print it says that the side effect of this might be that you will be dizzy so don't drive, so if someone drives after an operation, and goes home and drives and crashes their car and say well you never told me, but we gave you a leaflet, so is all this process of almost like risk management so the NHS said well we told you so, and it Is black and white we gave you this and you just think well if there was pictures it might, and the thing is as well it is different levels if they want to delve deeper there is the text stuff, there is the websites that you can go to but there is a sort of tiered effect, you build a tiered effect to that and I think as well it is acknowledging that different

people have different requirements, it is easy for me and again I'm just looking at my demo, white middle class who works and interacts in media and visualisation will want something that is highly interactive but that is just an assumption that I have based on my experience

DB But it is interesting even because you are making an assumption like if you give out a DVD that everybody has got a DVD player but if you are a Hindu who is only recently arrived from India, have been married for a year and just had kids the chances are you are more likely to have a DVD player than you are going to be able to read English and yes you can get leaflets in Hindu or whatever but most people have DVDs regardless of social class

J Most people have television sets and it is part of the research if you are going through the motions you can just work out what, there is lots of research being done and you kind find out what people have in terms of mobile phones, how many people have mobile phones how many people have a TV or a DVD and you just backup your argument with those, there is a great PhD actually I can see that being a real good PhD that girl has got there, she could get a couple of PhD out of that other students that you think are coming through. It is a real rich theme, I mean Jeanette's obviously got Val Carr going through and there is me going through media arts and imaging and they had Chris doing this stuff with Bob Steele and that in surgical skills, Chris Macelroy, I can't remember his name he did the ?? design aspect but you can see a real kind of really interesting faculty based medical research coming up, I think Mike Press picked up on this a while back when we were talking, we were just discussing this whole process it is not even about the actual projects it is about ?? people being almost doing residencies in the medical area, spending time and finding problems because that is what we are really good at, we found loads of problems and we are solving it with our common practice but it is like almost like building this think tank that thinks about these issues and you have got product designers, you have got illustrators, you have got animators and 3D visualisers but they have got so much in common there is so much cross over and it would be silly to have them embedded in schools because I think the schools structure actually inhibits that, I think faculty based it should be a faculty resource, but that is probably a long way, I would love to sort of once I've finished this is to have a chat with Georgina about this because I think there is too good an opportunity to keep, because we have got so many good links with the medical school and things, I must get back to Mike on that because it would be really important to

DB Well I will talk to Lisa and suggest that she actually comes and sees you this week when you are here so she can see this work

J Give her my email address as it might be easier just to email me rather than phone me as Hazel, well I will be down here and round abouts

DB I will email her and just copy you into it so you know what I have said to her.

J Well the experiment is probably over about 10 minutes ago and we are probably just talking about other stuff

DB It is really interesting, it is really interesting work. Are you actually showing that and is it in flash or

J No it is just a DVD I have authored an

DB And you are just going to different chapters of it?

J Yeh that is just different chapters is it like I mean it is funny I used to be a Flash animator and I was always keen to use Flash but I have found it so inhibiting, I did that on IDVD in an hour, just dropped in all my, I had all my movies set up

DB Because then you can have your videos and your still images in that as well

J Yeh and it is obviously you just put it into a DVD player, I mean the interesting this with this we have found was

DB You have just solved a problem for me there

J How was that

DB We have just being doing a live project with Tayside Police that finished on Friday with the Mnes students and I said I would send them the presentations and like they are mostly in PowerPoint but one they had to go into Flash to show something they had done do how do I get that to them so the police can actually have it rather than have print out of it so they can actually have it but do I just put on the a IDVD

J Get the latest version of IDVD it is free I think and they will have it on the machines it is part of Ilife because it used to be the best templates, I mean there is DVD studio Pro which is the pro version but

DB Whatever is low tech for me , is on my Mac already will be fine

J Well all you are wanting to do is be able to navigate through lots of things and I just find it the quickest way to get through a lot of moving and static imaging

DB Well that is exactly what I need it for, that is fantastic, good that solves the problem and the police will have a DVD player that they can put it in whereas if I had done it on something else

J Well you have got performances on Flash as well if you put it on one PC or Mac and it is always you never quite know how it is going to look but the only thing I've found and it is a good tip actually if you are running a DVD that has got a lot of fine detail on it, run it through a computer rather than a DVD player for whatever reason the quality that you get through running it on a Mac even those these are both authored the same way the DVD player is not as sharp I think it is to do with the connections, the connections from a computer is much better it feeds more information through. This is what the VRC is really for, centre space it really for this sort of thing

DB It is really good use of it, actually Ewen and I must book it and come down and do something with it as we need to do a bit of user testing and this would be a good space to do it in. So how long have you had it booked for?

J Oh well that is a good question actually I had to, I basically was starting to ask whether I could use it almost this time last year and it has taken me, I mean it goes quite in the summer I think but I booked it almost like 9 months ahead or so, although I didn't finally book it till a few months ahead but Jane had got it pencilled in so she kept it clear, this is a good time of year it seem to be quite at

the start of the semesters so if you wanted it is seems to be

DB Probably January/February, is it Jane that I do it through

2.14. Fine Artist B

Interview with Fine Artist B
Date: 23/10/06
Time: 12:15
Duration: 1:31:19

J *Basically what we have done here Tracy is I've split the projection into two halves and what I want to do is on the one side is going to be primarily the scan data, these are the scientific images, these are the images that come off the machines particularly MRI and CT and are used for diagnosis, I don't know if you are familiar with MRIs, magnetic resonance imaging is what you probably see on ER and so forth it is a sort of giant plastic tube with a giant magnet and you go on a table and they feed you into the table and they take cross sectional slices through your body based on this giant magnetic resonance links, it measures proton density of the specific materials in your body and it outputs then these greyscale values that makes the picture so these are the sort of starting point for the visualisations that I produce and some of the work that I have done recently, on this side of the room these are the visualisations these are the pieces of 3D work that had been produced as a result of some of the 2D scans, so it is almost like and one of the images I'm going to put up, simultaneously so that you can talk about them both and then I'm going to ask you four questions on each on, as you can see there is it split into four sections and they replicate one another so you have got arteries, kidney, aneurisms and blood flow, so if we start off with the arteries and I will explain what all the images are so you won't be completely blind as you go into them. So just to explain what we are looking at straight ahead, this is an MRI image it is a cross sectional slices, again it is not an animation as such it is one moment in time, so it is a bit like putting yourself through a bread slicer, but long ways rather than*

FB *So why is it so liquid?*

J *In what sense, why is it moving the way it is?*

FB *Yeh*

J *Because I'm basically scrolling through the slices backwards and forwards so if you can image this slice is going through your chest, going through your neck, going through the back of your head and the out the other side, so you have got your ears there and then you are back out the other side and then it scrolls from the front again.*

FB *Okay*

J *And the areas in white are areas of blood flow, so these are areas of blood as it feeds up from the heart at the bottom and it is providing the areas that have been highlighted is blood supplying oxygen to the brain, so we are really interested in any disruption to that flow, but this is very much a two dimensional image and it is a diagnostic image, it is what the radiologists use to make diagnosis of a specific condition. This on the left hand side on the*

other hand is a 3D reconstruction of the same piece of data, the same image and I say a reconstruction because the shape and the form of this has been informed from this piece of information but obviously there has been additions to that it has obviously, colour, there has been lighting, there has been a degree of texture and has also been specific camera views set u p to take you through the form as it were and these last about 10 seconds and they just cross fade into one another.

FB So this is the blood flow?

J Yes this is the ventricle arteries the white stuff on the images. And the first question I want to ask.

FB Can I ask you questions as we go through as well?

J Yeh of course.

FB So the first question is what insight and you can make comparisons and you can look at the pictures individually or you can look at them together and make conclusions together but first question is, in you own words what insight do you feel these images offer into the human body first of all and the second question which is linked and I will only ask you sort of two questions at a time because they are sort of linked, is how would you describe the visual qualities of each one of these images.

FB In terms of the insight my initial reaction in seeing it was trying to understand exactly what I was seeing, I guessed the white was blood flow but I find the movement of the image confusing but of course I stated to look at that one and I understood then far more clearly what this one was so found the two dimensional image difficult to interpret, in terms of insight into the body I would say I am using what scant knowledge I have to fill in the gaps, I am trying to interpret the image and I probably won't answer your questions in the right order but this to me is far more digestible because it has space added I can completely understand what the movement is and what the direction is and in a strange way I am somewhat scuppered as well as it is a very visual things, that moves kind of sideways where as that white bit ???

J Sure okay

FB And what was the second question.

J The questions was the visual qualities, I mean you have given some insight to the

FB And of course it is always interesting to know what you images are I mean my background is sculpture and three dimensional and certainly I know that I am a very three dimensional led, put together and I think the original in terms of visual qualities, it is maybe something about sequencing as well, trying to see where the start of this is and where it is going to and why it is happening, whereas this is far more digestible in the sense that it has ?? it has got a real representation but it approximates what I would expect of something of 2D animation really, the real stuff itself is somewhere on the trail of that.

J Based on what you are saying Tracy this links quite well with the next question, which is this notion of integrity and what integrity means to different

people and I kind of realise integrity is a general word to describe lots of things but from your own perspective and how you would evaluate work and so forth, how would you describe each one of these in terms of their integrity based on the fact that obviously this one has a degree of scientific integrity because it allows diagnosis so obviously it has an integrity embedded in that sort of scientific mode of enquiry but then as you move the image with a degree of human input, not to say that there is isn't a human input but it has a large degree of interpretation and in the sense that I have added lighting, colouring, I have almost kind of changed it to a point where it makes it accessible and I have deleted information so that it can be viewed, so in doing so do you feel that the integrity has done down, or have become less truthful or has it just changed into another type of authenticity, you what I mean

FB *I think it is changed but then of course I am starting from the premise that I assume what its integrity was so I know there is a certain set of information that has been useful up to a point, if you were looking at it and analysing it but then without knowing exactly what your ?? or aim has been in terms and what your parameters are as well I think as a complete outsider I would be far more comfortable with that so accepting the idea that human integrity is attached to your project I feel that ??? given that this is accurate in terms of ???. I would say that it has lost that but then if I put myself in the position ?? all I can do it presume that the in the right way you have got the information so if that is integrity, if integrity of that is intact then you are obviously not needing to alter that information but to maintain it, I would say this for me is far more comfortable but there a strange kind of thing I already feel like I'm imagining myself being presented with that information*

J *it is difficult to, when you do that, as it is medical and you realise what it might be used for to dislocate yourself from this integrity in the sense that you should really be authentic it should really be related to the reality of what is happening, there shouldn't be a degree of abstraction or ambiguity*

FB *But it is about fascination as well, I don't know what the scale is in terms of medical imaging and where this sits but I would imagine it is ??? it is acceptable up to a point although the medical divisions are probably looking for a develop within and therefore it hangs within a degree of integrity but certainly as a lay person being presented with that, I would really feel at ease because it is really difficult to interpret it.*

J *Okay we are going to move on to some static images now, as obviously these have got a degree of movement. What I'm going to do Tracy is just, it is almost like a collection of images that I'm going to show on the left here and we are going to keep this up for reference because this is still taken from that moving sequence so this is a cross section slice probably about half way through the head and neck area, on the other hand these are reconstructions that I'm going to put up and they have got varying degrees of interpretation but they are still based on that moving sequence that you saw so what I'm going to do is scroll through them, sort of put them on the screen for three seconds and then scroll through and then I'll stop on one and we will just talk about that one, use that as a vehicle to just sort of expand some of these issues. So we are just going to stop on this image here Tracy and maybe talk about the similar issues, first of all what insight do you feel this image offers to the human body and some of its visual qualities first of all.*

FB *In terms of reiterating what I've already said in terms of an insight to the human body I would say that my tendency is to imagine things spatial often so there is a kind of familiarity so that is really interesting as I have never see them before and back to what we mentioned earlier about interpretation so I am not exactly sure what the realm of interpretation is here what you've gone into and the scope there is a kind of seductiveness about the images that I find really intriguing, a jewel like quality about them which is very very interesting as it takes away the blood and guts and gore of it and I think that in terms of that sort of fear factor of dealing with body it is very much connected to that ???.*

J *I mean it is quite interesting reading some of these things into the work that maybe I'm but not prompted but fragility is one of the key issues through all the work*

FB *Absolutely, so what sort of fragility have you allowed?*

J *Well it is this notion, I mean it will become clearer as you see some of the other work but this sort of, delicate almost tortured structures are kind of finely balanced on this notion of even a small disruptions to these structures causes them to collapse, distort, break, if you have a stroke you are subject to all these conditions that as a result of these structures almost like breaking down and looking after, and again this notion of it is a very fragile instrument and it sits in a very tight envelope and it balances on a knife edge constantly and any sort of distortions to this almost like an internal eco system it is a eco system, it is a micro system and just like any good system pump it full of carbon emissions like the earth or if you don't look after it and respect it in context it will break down like another organism or any other eco system but I mean I'm probably giving too much away now but as you move onto the images it is this notion that you have seas and oceans and savannas within the body but you just never see them because you have not context and scale to them but scientific instrumentation allows a looking glass into that but it is very much*

FB *And I think possibly the general media don't know very much about ?? they probably have a stronger idea or image of historical medical exploration that deals with contemporary and that in itself it an extent that I do feel, instrumentations, the early pioneering stages of X, Y Z and so and I think the thing that connects to something that you were talking, what is removed here but can fit into this bit here and of course it is removed from everything that is depending or resolved but it is like ?? and so that fits.*

J *It is funny this is a discussion I've had with some of the other artists like Edwin and ?? we talked about this and this notion of does the work stand without this explanation, without this insight in it without the art space insight, integrity is very difficult to pinpoint until you have insight, you obviously, until I told you what a lot of these images were even without, even just based on factual insight on this image and interpretive insight on that it didn't really say much and it didn't really function much and it was very difficult to, it is almost very difficult to pin your colour to the mast and say this one has got integrity and this one has, until you know what it is about, because they are abstracted in different ways, it is this constant struggle between giving enough information and sharing enough of the origin points and even a degree of like, well you need to navigate through and get your own conclusions and so it goes for this as well it goes for the purely science based work which has no*

degree, but in the sense it has no degree of aesthetic interoperation it is purely like instrumentation to it developing a image that someone can make out.

FB And would that traditionally be in black and white?

J Yeh

FB That is fascinating in itself.

J And I find out why there is a degree of historical issues that black and white provides the best contrast and obviously if you are moving from x-rays into CT, into MRI and that is the kind of evolution of a lot of medical imaging and obviously a lot of, but these machines can output values through any colour it doesn't have to be black and white it makes a measurement and it outputs it to a colour range or scope but obviously a lot of these medics are trained in a specific mind set so the question they always constantly ask and I suppose if you ask it in a different way that they ask, how close is that to the reality, how close are we to, how far away has that become from the reality of those organs because when you take these images it is almost like photography so if you change the aperture and you change the films, you change the image and the same thing goes with these 3D, these 2D images.

FB And I think sometimes you just think as well when people, what people are trained in, how they are trained to look at that, if they don't have a visual training for that, within their field then that becomes a framework that they work within funnily

J That is a good point, that is a good point actually and that is what seems to be coming out in a lot of these interviews that people, the medics are reading things, kind of vocabulary and they are describing every minute detail but they are not judging the image as a whole, they are actually, they will tell you all the anatomy and tell you what it all means

FB Or even, what is coming out when I'm standing looking at this I am thinking about contemporary animation but also there is a lot to be said for keeping pace with your audience because where we are no in terms of viewing it is a nightmare to where we are 15 years ago because, all these everyday experiences that were very useful, some have become far more skilled at looking and demanding, forward demanding of degrees of modelling or whatever you want to call it, image making, so surely that is something that is quite relevant in itself, I mean you audience tells

J Yeh we are visually literate in that sense

FB Far more

J Particularly digital imagery

FB Without being required to be skilled in it.

J It is funny because it is, I think, I agree with you that we are much more visually literate but we don't look and I think there is a difference between, it is like you go to see something like the Matrix and come completely bamboozled with this kind of Neo Baroque style of visual presentation but you

never seen any of the artistry it is almost like, it is like looking at a Caravaggio painting running at 25 frame a second across a ninety minute feature film but to really appreciate Caravaggio you have to sit and look at one of his painting and reflect up on it and its space it is like, but now we have got Caravaggio running at 25 frames a second across a whole feature length movie but why are we building so much detail into something that we can never comprehend, people watch these DVDs and you could freeze a frame and look at one frame from one scene of the Matrix and look at it and really see artistry instead of watching 90 and not seeing any of the artistry it is almost like running at the wrong speed again, I don't know if you saw the documentary, it was kind of a documentary

FB Caravaggio

J It was a kind of sculpture of Caravaggio and highly stylised

FB Sensationalised

J Sensationalised version of his life and there was much more complexities to his work but it was interesting even on that level, lets move on as we have got quite a few bits to get through, but it is really good we are covering a lot the issues that we are going to cover. What I want to do is I want to move onto the kidney actually, some thing that is actually quite interesting is that it is about the gallery space does allow a process of reflection that you just cannot deliver through cinema, you can't deliver it through TV it is almost like a lot of the imagery that is produced needs reflection, needs digestion it needs to be stopped

FB Well that is one of the ways of looking at an intellectual process to let you ?? which is another thing that we have gone really turned into and you mentioned looking and the way that we do that and that we understand how to process information and what we can do with it

J I suppose it is maybe an insight that artists have that they ca, I suppose on the ?? equally, I think it is the thing that you describes, well a thing that we have been talking about this issue of overloading and it is almost like a, something that especially artists work can be a lot of these contemporary media don't take on board I don't think, you kind of get a Bladerunner approach to every 3D animation that has been produced it is just, there is a sophistication but it is the wrong type of sophistication. So the image that you are looking straight ahead at, so we are looking at the kidneys now, we have moved further down the vascular system from the head and neck down to the kidneys and this is as you can see here this is a cross section of slices, this is one moment in time that that tube going down the middle that splits there is called the aorta and on the left it is the kidneys and this is a scan, a diagnostic scan to diagnose a condition called renal artery stenosis which is basically a narrowing that occurs into the kidneys and the image on the left is that same kidney the kidney on our left from that scan that has been reconstructed it has had a degree of transparency added to it, it has had digital lighting added it has been orientated in a very different way to the original data that I started from so maybe if I could ask you Tracy to maybe describe some of the visual qualities of each one of these images and obviously which insight they offer but also I want to show you as well the condition that this is, you can just see it there on the right hand side, se the tube is nicked there is a like a little nick mark and that is what this has been

scanned for to discover that little nick because basically that means there is not blood or hardly any blood getting to the kidneys so one kidney is working harder than the other and again it prelates to this notion of even just a small little disruption like this can cause really kind of serious problems at the other end.

FB *Does it also mean that the person is analysing this data has to have that bank of information beforehand, in other words they need to know what they are looking for they are not going to spot that willy nilly*

J *Absolutely I mean the radiologist train for like 10/12 years to get to the level where they can read those images and they have to realise, they have to know the limitations of the equipment that some of that might be artefact and that may be down to anomalies on the equipment, it is something that isn't actually there, for instance it might be dust on the lens in the case of the photography, this dust on the lens causes a distortion which isn't actually real it is just a nature of ?? and I think that is important in these images that they aren't an absolute truth they are not even a reflection of reality they are reflecting the proton density so again it is all this, it all has degrees of interpretation it is just ways, I suppose it is a starting point which puts perceptive on it*

FB *But is the information being analysed from within a certain*

J *Tight parameters*

FB *Really tight parameters*

J *And it is reproducibility*

FB *for the interpretational or in terms of discovering ?? or is that not what they are looking for*

J *I don't really know and that is a good question actually.*

FB *It doesn't have a ??*

J *I think they have what they call a reproducibility models which mean if you take one image of one patient and take another is it reproducible because the last thing you would want was taking one picture and then taking another and it was totally different event though it is the same subject matter and the same equipment so they have these things called protocols which they must follow and the basically when they run these scans and the doctor says 'I want to scan the brain' they will have a specific protocol that they punch into the equipment and the equipment will run a scan based on that protocol*

FB *So it is entirely built in?*

J *Yes and so that will have been built up over thousands of patients so the equipment will be calibrated so*

FB *That is really interesting because when my son was born he had extreme deficiency of fluid in the likes of his brain and he had brain scans from the beginning, from day one, but there was no comparable data so that scan of David's from day one unless there is something now to do it, so we went*

through this cloud of a period of where all questions were about how can you analyse the information if you don't have anything to compare with and it was just a wait and see situation, so I think this is really fascinating what we are looking at this, I mean me looking at this now I am looking at what I know, I am looking at the kidneys and the blood flow and how it works and then when I've done that I'm starting to look for other bits of information, what are these things and it is like a kind of a moving etching it is like reaching into the dark, it really feels like reaching into the dark and again with this one, and I don't know obviously what you have done in terms of transparency, translucently lighting why the angle has been chosen but it is a more believable 4D image.

J *So do you think it has a degree of authenticity and integrity to it, even though it has got*

FB *Definitely a degree of authenticity so I mean I trust you so therefore I believe that the authenticity is there but in terms of integrity I would trust that far more quickly than that because of its*

J *Can't to relate to it at all?*

FB *I can't relate to it, it could be an amoeba, whereas there is almost hard matter in them but it is a contradiction in terms, digital*

J *It has a solidity*

FB *Yeh*

J *It is almost like it is implied but it is*

FB *But also the aesthetics are really important because it is an incredibly beautiful thing isn't it has gem feel and there are lots and lots of ?/ it is very beautiful and it doesn't have the kind of, there is something about this image*

J *I suppose they are for different purposes as well isn't it, it is almost like, it is funny though just hearing you talk and navigating through the images it is almost like, it is interesting that I'm giving you information about a scientific image but I'm not a doctor and it is almost like to achieve that image I have had to gain a lot of knowledge it is almost like if it were a artist, an animator or designer whatever you might be you have to basically verse yourself in the field so well because you can't produce any work that has any integrity and authenticity if you don't know what you are starting with, what the issues are to then make the work.*

FB *Exactly, so your influences to me prompt a lot of what we are looking at now, how would you immerse yourself, that takes a radiologist 10 years what, why are you presenting this in a very kind of particular way and angle and how do you become sufficiently versed in their language in a relatively short period of time?*

J *It is just like the good old residency process you just have to be there and do it, it is almost like building, I mean I know in medicine they call it residency and in design they call it immersion and on the movies I don't know they call it but it is this*

FB *Being in a place and*

J *Being in a place and a lot happens through osmosis and I think the most interesting stuff happens through osmosis and chance and chance is a huge issue*

FB *In term of you working with material?*

J *Well just chance encounters, being in the locality of really kind of, I mean it is a bit like you watch ER and you are completely embedded and you feel you are in the ER ward and you are walking and you are meeting all the characters and getting a feel for all those people and you have seen patients come through and you are a fly on the wall so I'm the same, I am there I make the coffee and the tea with all the nurses, I wander around and have a free range, that is built up over time and confidence, they can trust me they know that I'm not going to do anything unethical they feel that I have had all the screens and checks done, I have been vetted so that I can work in the environment and I have passed all the safety, there are lots of safety issues when you are dealing with radiation, x-rays and I deal with resonance so once you get through all those hurdles you are then there and there for a certain period and you produce work and take work and a lot of this started out as I said to you at the very beginning it started out as a process of translation and almost illustration so the work was about communicating directly, could I produce stuff, a it like a design brief, but it is almost like I get bored of that now because that has only got one story to tell it doesn't tell all the other 5 or 6 stories that relate to illness and some of the stuff I was talking about earlier about this internal eco system and its fragility those stories are not really told when you are just having all your blood flow goes through like these documentaries from the 50s 'you blood will pass through here and go into your kidneys' and that is a perception of what an artist should do in these context that is the kind of historical kind of almost like origin, starting point and you have got Gray's Anatomy, you have got a lot of these sort of traditional, you illustrate what you see and you make it something different to use to communicate but there are much broader issues that you can communicate but it is very difficult once you start to pull it out of that environment, that medical environment and I think this is what this is about it is almost like plunking it in a art space context, bringing in people to discuss some of the more philosophical and broader issues that this work might present and some of these questions the work might answer or not answer, it is almost you moving through the spectrum of the arts almost as well you are moving back and forward between what design might be seen as, what fine art might be seen as*

FB *Yey*

J *And when you change certain things and act a certain way and become, and I asked someone, I don't know what I am any more, what do you think I man and he said 'well you should know that by the end of your PhD you should be able to define' but I'm still finding it difficult to define that role that I am.*

FB *Where are you in the PhD*

J *Probably about a years time.*

FB But it sounds just from looking and describing that it has changed your perception of yourself, your role has changed as what you are doing is very successful

J I feel less like a designer and more like an artist the more time I do

FB So were you a designer when you went in?

J Definitely, that is my background industrial design I always had to have a purpose for what I do, I was into deliver a brief and worked to specific creative parameters and that is very much the insight, the starting point and that probably got the project off the ground, but now I'm inside I realise that there is broader commissions to be asked and there is more issues to be explored.

FB Nice place to be though, if it feels like that then it is really brilliant that you have got something, and it is about how do you define it, should you define it do you want to define it or should it cross, it is a kind of 'trying just to survive' thing and of course context is absolutely vital, how you present it and where you present it

J I think that is a real kind of issue, I think context is, and everything else sort of spars off somewhere. I'm going to put up another image because this relates perfectly to this next images to what we have just discussed and I'm going to keep that as again it is born from this data and this is an image that is taken from the same piece of data, it is taken from the same scan it is that kidney you just saw a second ago but it has been interpreted in a very difference way and I'm exploring very different issues, I mean even just to give you a time scale this one is fairly recent that image that showed you internal structure of the kidney it was produced a year or so ago whereas this one was produced maybe 6 months ago, in fact that one would go as longer as probably 2 years ago. So maybe could describe some of the visual qualities of this one and what insight you feel it offers, and I will leave it up, Can I pour some coffee?

FB That would be great.

FB Yeh it is a fascinating image after the one we have just been talking about there is obviously a close, it has completely different qualities and that is such a sculptural object, it is completely, and I know I just said I know what kidneys look like and I don' really but that is what they look like and that is great because the object quite an ineffable presence in itself to be able to move you away from the originality of the source, so that is really interesting, so what were you exploring when you were making that one?

J It was this degree again, it was this degree of fragility but preciousness there has been some chat and I have already ?? prop typed this and maybe looking at maybe making it in porcelain or something that makes it look like if you dropped it it would shatter

FB It has that feeling already, em

J When I made this image I was looking at this process of being dead, that I had removed this from the body and it had lost its life-force its blood because obviously when you remove a lot of these images out of the body they do, the reason they are red is because they are full of blood often and obviously

when they become deoxygenated and they put them in these preserving agents they change their quality they become sort of bland beige colour and also they loose their shape but I have been able to keep the shape and keep that rigidity.

FB What about that, how did you make it?

J Basically because I have used the guide of the internal body, so if you were to really take somebody's kidney out and leave it for a couple of weeks it would start to flop down as all the liquid would come out but we are always keeping the solid structure as it exists in the body but that wasn't where I finished it, when I finished the work it wasn't that one, that one sort of moved away from that, this is not about being dead this is about being what you said, a kind of beautiful form and almost I lit in the sense to highlight these little undulations, those little valleys, you just want to run your finger across it and feel the, it has this kind of almost, I don't know what it is, there is harmony to it but I can't put my finger on it, I think that was what I was interested in.

FB It looks incredibly tactile and I think that almost has an overwhelming feeling but also steel plays a good part too as that is a huge thing

J So do you feel that image has got a degree of integrity to it or do you feel it has moved into much more, ?? as poetic truth but it has moved into exploring other questions other issues that the other one maybe didn't?

FB Yeh definitely, I would say that between the two in the other one I had feelings of information but that has shifted completely with this one it is far more coming into my territory I think that I understand it as an object and I'm already trying to interpret what it would feel like and what it is filled with and for me things like you mention like the fragility are far more relevant here in this image, it is a different kind of fragility in the other one it is fragility of information and function and here it is more to do with form and logic.

J In this particular image as well the projector doesn't do it justice I think to really build the quality of this, to see it in print it is a hundred times better when it is printed, it is just because there is not enough pixel information in these projects to really lift the detail or project into high definition to really as there are so many subtles especially in the shadows, this has taken months to get right, or weeks anyway to get right.

FB So when you were making it how, or where are you off of putting it as a sculptural form?

J Well it is funny because it is something that, I mean I an not a sculptor but I have worked with physical materials because I'm an industrial designer. I have built things with clay and I've built things in foam and built to different scales and I know the quality of being able to run your hand every section and just feel it quality, its physicality but from my prospective is coming from a sort of building a beauty to something rather than making a statement of issues of, you cal tell a story without making it beautiful you can tell the story through making something ugly it is a different story you are trying to tell and I have just gone down one stream, I'm interested in fragility and form and structure through kind of harmony, through beauty rather than through, I mean I probably sound really naive in your kind of discourse

J No, no I think it shows how really interesting about how you present these series of images what you choose, how you edit and the groups you could do, there are lots of sets in the previous image in this dimension

J Yeh it is almost like a collection, it needs to be shown in context though doesn't it to follow the track. There are really good these images because they almost turn into sort of seminal, they are not tutorials but they are also interviews that have got relevance to my PhD and is it really good.

FB When you look at that it reminds you of things, you were talking about a trail in the woods somewhere, I don't know in Cumbria but coming across incredible form it is almost you find forms that you understand but you have never really seen before or filmed before it is like being familiar with your own skull but you have never seen it

J Yeh there are all these sort of fairly inert objects that we are surrounded with but they have their own beauty, it is just that you are not looking at them in the right way. It is funny there have been three perspectives on this the sculptural, Gary Fisher thought it looked like a remainder of a stone on the beach, you know the stones that are all kind of rubbed together and Edwin obviously made the porcelain, he could see a room filled with porcelain on little plinths, hundreds of them in different orientations, but it is amazing that one image can generate such different, it is like finding the beauty in fairly ordinary, I suppose that is what Caravaggio did wasn't it in some ways.

FB Yes and then you look at things like the painting of John the Baptist and the notion of self ??? it is staggering

J I mean you watch these things, I knew about Caravaggio, I mean Caravaggio and Vermeer had a big part to play in a lot of the work I produced because of their ability to manipulate light that we just can't do in computer graphics yet

FB No

J And the sophistication, and I mean they are trying and art directors want that and you will see it in live action movies but we just haven't got the computer graphics yet because it is so hard, I mean what they achieved six hundred, four hundred years ago it was just awesome and it had soul, this notion of soul and I think that is why it has to be much more collaboration between fine art or between artists working in traditional media particularly and artists working in the contemporary media and this kind of cross over because you have got so much to learn from each other and there is this process of because we want to achieve the same thing really

FB It is good to hear that you have spoken with Gary because that is something he is really interested in, you can tell the traditional approaches and methods and he is really interested in that as an artist and using contemporary media in the and what you are describing.

J It was good to get these perspectives on things and I'm going to show you another set of images, this is kind of moving into a slightly different start point, this is a, it is called an aneurism, an aortic abdominal aneurism and it is something that happens quite a lot in Scotland due to heart disease and so forth and this is a sequence here, this is a CT scan so this is probably the scan they did on your wee one, this is kind of cross sectional going through

the spine and the body and an aortic aneurism, this is where the aorta is the main blood vessel that feeds from your heart to your legs and through your groin and down to your legs so it is very pressurised so if it becomes distorted or damaged in any way it is bad news, and again this processor calcification happens on which can cause like aneurism, calcification is exactly as it sounds it is a build up of really brittle material inside the walls, inside the pipe

FB Narrowing

J You can't really see it but this is the, so this is a CT scan this is not MRI scan this is really x-rays. So this is a 3D reconstruction built from that, now this is a very different quality this is very much kind of almost like very little interpretation has gone on here this is a basic and orthographic camera, there is no perspective on this, straight ahead and it is very basic colours and very little lighting has been added so it is almost like the closest you can get to the scan data without, because I have not smoothed it I have not manicured it in any shape or form it is just the data. Maybe I can ask you what you think about the visual qualities of each one of these images?

FB I keep thinking they are the top of something and wanting to go further plus I find it really difficult to interpret this, the images on this screen far more than I imagine and again I think it is a trust in the same kind of three dimensional information that makes it far more understandable. So for me they are not really comparable, they are two completely different, you would have to work really hard to understand what it is and to

J Okay, so it would be probably difficult to make any comparisons with regards integrities really as they just function from polar opposites

FB I think they do and I think it comes back to questions about the interpreter of the information because if I had that scan done on me I wouldn't see that clinician would I

J No, you might if the consultant wanted, for instance what might happen, which sometimes happens you might go

FB Highlights it

J Yeh he might stop it here and he might say 'well Tracy the reason why you have got this here is this is calcification built up and gives a furring of the arteries, this is the fur'

FB So on this thing how does this relate to three dimensional models that the medical profession use

J They have got three dimensionals and I can show you one I mean basically the three dimensional ones that they produce have a very different feel altogether they don't have a very, they are very much, they are almost like a midst I will show you exactly what I mean

FB But that is interesting that there are ?? but also with this of 3D imaging so there is a huge ?? to me

J Yes but a lot of them prefer to use the 2D images because they can build them in their own heads into 3D they don't need the 3D to build it in their

heads because they can do it already, they have been trained for so long that they can just read it and instantly reconstruct it

FB *Translate it*

J *And obviously their biggest worry it that it is made into 3D even the medical software makes it into, how different is it from that, how much translation has gone on, is there any bits of information that have been lost in the translation*

FB *So in exactly the same way as you would discuss a novel being translated into ?*

J *Exactly and here is an example and this is a 3D reconstruction that they would use and it is almost like a block*

FB *Weird, like an ice lolly or something*

J *It is called a volume reconstruction, so you can make the parts and obviously there is are attached colour values to the, and what they might use this for, they wouldn't use this for patients they might use this for surgical planning and interesting enough they have this thing called a multi disciplinary meeting which, so say you are a radiologist, you have spotted this little nick you might put this up on screen at the multi disciplinary meeting which is basically they bring doctors from all the areas that might be involved in the treatment of the patient so they will have the radiologist there who has done the scan and you might have a surgeon from a, a vascular surgeon you might have a few other medical students sitting in and they sit and literally decide in a collective and each one will have their perspective on it, so the radiologist would say 'I think we should do this based on this data' and the surgeon will go 'are you sure that is actually there' and then they will say 'yeh based on this we think it is this and the surgeon will say 'oh yeh' as the surgeons are really hands on they don't read pictures like this they want to open you up and feel, they are like physical people, although they will understand this and I'm grossly synthesizing stereotypes here because they are all different but it tends to, you should speak to Moira Payne, she has been to a few of them, Moira has been to a few.*

FB *Yes I know she has been dealing with Ninewells also for fine art but I think it is a fascinating idea that you come round the table and you bring your different expertise and somehow your live collectively at an agreement or an approach, this is very very interesting.*

J *They might even, a lot of it may come down to 'is this patient too old to deal with this'*

FB *Sure, sure*

J *Is this woman really going to get any quality of life, if we go on and cut her open and expose her to impossible infection and what is her quality of life so there is ethical issues coming through but the patient aint there they have no representative there it is almost like this is where they play God, this is where they decide people's lives and then there it is probably healthy that there is the group but you will probably find most of them will be men*

FB That why I'm fascinated by the whole euthanasia debate, the whole notion of the weight of the medical argument, you can go through all that debilitates the use of the argument in the face of consensus or not

J Oh you hear some horror stories though about, they have still got an ogre in medicine and it has come from the school of mean all over the world and this is the and I mean a lot of woman just do go into becomes GP because they know they can get a maternity cover and have a better quality of life so basically the key jobs in medicine are often donated by males because, so there is this whole question is it a balanced in a profession, but then they have these Ethics Committees, Ninewells has got an Ethics Committee, and Ethics Committee consists of retired clinicians, lay people and there is so much beurocracy in it, I mean you have got to go through all these committees and they don't really understand the subject area so they kind of want clarification and you go through this constant cycle of rewriting like a 40 page document and so I don't know what the answer is, it is very difficult as an artist as they do in the clinical sense they do have a lot or worries about what might happen or what you might produce

FB What you might produce?

J You know if they can't relate why an artist would be working inside the department of radiology and a sense of occupations.

FB Yeh I see that, their interpretation of you, not even of what you are doing but of you and where you are coming from

J They see me as a very different beast to someone like Moira for instance they can't relate how Moira and I would come from the same faculty because they feel that what I'm doing has direct interaction with the patient and where is the art in that, where does the art bit come because obviously you are dealing with scans and you are dealing with computers so they often can't see the link, they don't realise it is just another type of media

FB Nut then you have to explore their notions of creativity and all that

J It is very hard because we have lost, we have become so obsessed I think as a society with like drugs and scientific paradigm for enquiry we have put so much trust in it that it is going to give us all the answers it is going to provide us with everything, a good example where it breaks down, you can spend billions of dollars on developing drugs but if people don't take the tablets then what is the point, and if people don't look after themselves

FB But I think a lot of, last year I think it was when there were suddenly articles appear about heart surgery and the surgeon had looked really closely at an artists drawings and that was just fantastic, that was so amazing after all these years that information comes to looking and translation to drawing it is there for hundreds of year on, it is fantastic. So these are gel tablets

J Yeh we will start off with this and I'll give you an explanation of what you are looking at and in this case straight ahead of you is the vascular, it is the heart basically a cross section of the heart but this is across time this is not one moment in time, but interestingly enough this isn't actually like, this is real time and it looks real but it is basically acquired over like several heart beats because the machine can't keep, so it almost takes like time lapse images

and then ends up after a few seconds it will end up with a full heart cycle so it is almost like one frame from that is a heart beat in one moment and the next frame is a heart beat and the next so it is close enough but it is still going to be interpretation, on the other hand this image here, it differs from the other ones because it is a hybrid of different types of information, you can't really put it down to one source or one scan I mean basically the tube there is taken from that aorta pinch in it so that tube that stuff is moving down is scan data the little red blood cells, the movement of them is not directly translated but is informed by this, so I have not taken scientific numbers and plugged it into the software and plug it into the process that I use, I have actually just eyeballed it like an animator would when you look at

FB Is this a sort of approximation of pulse?

J Yeh and it is also exaggerated slightly to extenuate the movements so you get this feeling of pushing and then drawback and then pushing and the red blood cells again are the same boat they are obviously massively oversized and there is much more of them but what it is doing, I feel it more efficient in communicating the movement, so obvious

FB Different

J Totally different images but how would you describe the visual qualities and what insight you feel they offer?

FB I am thinking about what you described in terms of processing and how that image was made, em lacking, I see these images on the screen and I wan t more information they want a fuller understanding of how it functions but this is really seductive obviously because of the colour and the form the way it feels because there is an instant understanding of the movement but also the structure that it is really and that is really hard to get from this, so it is a clarity thing, I like the attractiveness of this, it is ?? stripped away and you end up with forms ?? information a model so the clarity about it ?? and this kind of thing the black and whiteness, it is too ??? but yet that is instantly translatable in terms of what I know roughly about, so I think it is really successful in terms that it doesn't it translates, it puts the information across, it is quite hypnotic actually it is absolutely not worrying or ?? so in that sense very difficult from my particular imagery.

J And in terms of their integrities Tracy do you feel that is adopting a different authenticity and even though it is not delivered from a real person and it is a collaboration of lots of

FB I know it is an approximation but that in itself is, you haven't told me that is totally acceptable ?? and again it is about a feeling of the access to the information, here is it like a bit of it and not enough to understand it and here I understand what I am supposed to be seeing, as I can understand it, to form I think it is really engaging through that.

J There is a couple more images that I want to put up, the last two images, now this image here is the aorta, again it is one slice in time and that is sort of sliced through as it goes through the centre of the chest down as it splits to the femoral arteries and this is an internal shot of the aorta, where the blood cells moving through, maybe you could describe some of the visual qualities and what insight you feel they offer.

FB *Okay so this is the still image, so instantly it is informed well enough to see, presuming space is the most important thing, you get an instant feeling that somehow this is taken in a vessel of some form and it is going in a direction, this is where you are heading and there is no notion of movement or pace, it is, it could be ??? connective ?? but certainly the related items doing something collectively*

J *I'm going to put another and this is the last image, this is the, a 3D reconstruction of the aorta and this is the pinch, where the pinch was and it has got a degree of interpretation in the sense that red blood cells have been added and it has bee illuminated in a certain way.*

FB *Say again about the cells being added*

J *Yeh the red blood cells have been added just to extenuate the movement but they are purely and obviously interpreted*

FB *To focus on that, it is interesting like landscapes like ?? and there is years of studying in terms of how that relationship runs and it is very interesting in the way that the images are so, computerised if completely the wrong word but inhabit an environment that is about where they are made it is very interesting and here it is very easy to interpret what is happening to the blood cells in that movement through that, that pinched part and I think it is really successful.*

J *It is funny I wasn't really consciously selecting them or composing them to make them feel like landscape or to have that, I know what you mean it has like got a kind of structure that reflects*

FB *And in a applied scale as well, that is a nice part of it.*

J *Shall we grab a seat then, that is good that is the first part over we are just going to maybe talk for the last 10 minutes. Tracy I just wanted to take you through the final stretch based on this notion of integrity and what you think it is and in your own practice but before we do I just wanted to talk you through some of the stuff on the table, I call this, these are the sort of origins to the work and we will maybe start off with the traditional stuff at this end and these are basically, how do I take these images, what is the process is it just a purely technical process and I think the origins of any image and the stuff that has been done to produce them and making that transparent does affect its integrity it does create a transparency which is probably quite, it is best that this field or domain that I work in, so I wanted to just take you through that and just on the one half, the ones on this are a real appreciation of anatomy they understand the internal structures as vital but what is interesting is obviously I use a lot of these as guidance and I've done what a lot of people do it take this as absolute try and it aint because it is somebody visual interpretation of what these things look like and you have found that a lot of things that each person, each anatomist has a degree of integrity of his own and whatever er you are gaining and you are recommended to read one type of vats of anatomy which in a sense, we always say well its an a anatomy book and surely it is the human body and they have just drawn what they see but they don't they draw what they think they see and sometimes what they think should be there based on several observations or several cadaverous*

and historically what they have referenced so this notion of like truth in this this is absolutely wrong as well

FB Fantastic, absolutely fascinating

J And so you start to move into, ?? and Rembrandt and stuff and you think why has he got a grotto at the back, surely this is, this is no more interpreted and no less integrity than something like this, he is using the contemporary media of his say to reflect what he sees in the human body and you will probably find a lot of the anatomically, not so structurally it has just as much integrity as a book written 10 years ago, do you know what I mean

FB I know it is like when folks talk about touching on context as well and certainly in terms of this image it is also being like a Caravaggio how much do you understand that it was the context at the time and you think that is ?? the darkness is like ?? low levels of light is what was there at the time and I think that is really fascinating

J The sophistication of that

FB Yeh

J It is this incredible that you couldn't kill ?? and if they went to the other end of the community and be done for heresy not Rembrandt but certainly Caravaggio and all his patrons as he had all those rich cardinals who

FB It is also the ability of what is expected to feel inside and the beauty and you look at this and therefore you get back a certain Caravaggio and that is ??? we are far less selective of the

J It is like this notion of poetics and poems like in the first world war I like working class guys infact used to carry like little books of poetry, do you know what I mean

FB No

J Poetry you know and that was seen as a sort of one of the classics to better oneself you would, you can imagine somebody in Iraq collecting poetry and there is this, we have kind of lost that

FB But is absolutely tied to our attention to ourselves and our bodies as well and that is some form of art

J Yeh there is not many more to do with our own bodies and I suppose

FB Intellectually not but I think

J One thing I want to show you Tracy as well is this sort of process, I use this as the guys in medics do as well and it has ??? this kind of Caravaggio or Baroque's type of approach dealing with light and focusing peoples attention to specific things, literally dragging you though him images by the scruff of your neck but also the subtleties are for me as I think and in a lot a Caravaggio there is this kind of use of light as well and the optical qualities to that phenomenon and then some of the qualities of this it is just the clarity of this is awesome and then there are things like this and dealing with light in

this dragging you through all the issues, and that she is a prostitute and she is supposed to be Mary Magdalene

FB *That is about*

J *And I think is it all about, I approach it from the quality of the light and not the symbolism of this object in its self.*

FB *So how do you see these, it is really interesting that you are using the painter there and it is probably involved with everything else and where in your sate of not replying more where do you see these going?*

J *I really would like to move the stuff into more a reality context and move it into some of these more developed and I think as you say through these small cushions for the church and keep then happy and feed the Pope with what he wants to see but also I'd like to do my own stuff and broaden the work into much more sophistication and asking questions because I think you inform one another because you can't be cutting edge and build really nice stuff for patients unless you are really pushing the info for your own practice as you would just grow stale you just become, you produce the same stuff over and over again and the same style and people soon get sick of it.*

FB *I suppose if you talk about presenting in a context and all the different things that come with it you have to consider so much when you are working on and what you expect them to influence the work because I think that is continuing dilemma*

J *It is a new field for me Tracy to be honest with you I have never exhibited really properly I've never, it has never been my area it is almost like I am just sort of tentatively sat in the dark not knowing because I have been so driven by functionality in what I'm doing and having a reason for it and you forget and you are right there are so many variable to consider and it is*

FB *??? and he works with a local life and death themes and he is really interested because he can study what he feels because his mother contemporary darling you know there were theme so what happened to our themes where have we gone to as a society but you should maybe have a look at just, because there has been a lot of work about death and it is very theatrical and he draws really strongly from the theatre but it could be really interesting to see his presentation they way he actually presents his works in museums and galleries.*

J *I hope much of that has gone on tape and I will remember his name*

FB *It is moving away from some ?? but that is probably really good.*

J *I think that is, because what I do is a process it is like a way of looking at the world in different ways if there was another non medical orientated context to try and see what I could come up with based on a different starting point*

FB *And if you could view, I'm sure you know Martin Kemp he is a really interesting source he tells us presenting objects and artefacts within a sphere and often*

J *He has got some really good books in the library actually, I've read some of those he is a bit of an arrogant so and so*

FB *But he is great, eccentric and is very generous*

J *He is coming to Edinburgh next year he is giving a lecture in Edinburgh next year.*

FB *He is a brilliant guy I think he is a great guy and just an expert in the field and he*

J *He has written a lot of books on religion in India*

FB *I think he is interesting because he is really used to curating exhibitions so he is often drawing on collections that maybe ?? and not about medical projects by any means but it is about object that somehow relate to your field but he is incredible within an exhibition framework, he is very very interesting on that front and he is talking about truth and authenticity as well*

J *He is, he wrote an article last year about nature and about the whole notion of truth and the state of computer graphics and there was a documentary on about the, it is called, it was called life before birth and it was plotting the process of, from the embryo through to the day of birth and obviously aspects of it were computer generated, or large chunks of it were computer generated and it was intermingled with the scan data and so you were totally, you fall into the whole thing you thought you were the baby day one all the way to the end but in actually fact 70% of it was real and he said it is this issue of authenticity and truth that computer artists must have a degree or they must be transparent to that they must make audiences aware that they are not looking at something that is real*

FB *Although it has to have some ethics as well of course and information on how you have the potential to tell you audience from your own*

J *It is all a barrage of stuff that could be probed further isn't there*

FB *Yeh and it is fascinating this*

J *This is just a kind of couple scenes and this is some more recent work which a totally interpretive in the sense that is a heart that I sculpted from scratch there is no memory data in the sense I have not actually taken this from the scan data and then I've painted it up*

FB *Why did you take it from scratch without referencing it?*

J *Because I just wanted to see how artistic, I wanted to explore this notion of integrity do the medics see that as less integrity because it is formed by this or more*

FB *So what was the objective of this was that the ?? for that purpose*

J *It is a bit of both and there is a lot of people obviously that is it and they have looked at that image and they have said, is that panel real is that not taken from real data and not realise that this kind of, because I've used computers doesn't mean that I have, that is has come from science it has come from*

scan data and it can be just as deceptive and build stuff that doesn't exist in computers as you can with and I think I was just exploring the altitudes of integrity and authenticity on a purely interpretative 3D computer images rather than, because all my images they are all pretty much hybrid images they are bits of both they have got bits of both in them whereas in this one, it boils down to what you have said before it is context rather than authenticity if used with a patient this would really give you a feel for what is really happening but it might have less integrity if you were going to use it for possibly for a diagnosis or used for anatomical teaching

FB That is really hard and how much depends on

J This is a photograph that I took which is of a mammoth and I was fascinated by the structure and symmetry of this image and it helped me with this because I picked out this beautiful structure of the body and I can match in my head with an image I quite liked so it is a totally non scientific selective process of defining structures that I like based on the world that I see around about me the influences that it has, I mean it is a bit of a sense that you know when you are a student you collect all these ?? collect loads of stuff that relate to producing work but when you work in the scientific domain you feel you shouldn't really do that but why not if that is how, and relate thing to real work, structures and particularly there is ?? which is like heaven and earth to me which a lot more structures relate to the body and the language of that is adopted in the stuff that I do and a lot of this stuff as well

FB That is what I meant when I was saying it was similar to ???

J Trying to create a new reference point for a start, Well I'll ask you these last few questions. What would you define as visual integrity in your own practice, how would you define, and it is a fairly loaded question

FB It is a good question, how do I define visual integrity. God, I think is has been interesting listening to you using the word integrity and authenticity and sometimes they cross over and become almost interchangeable and when you mailed me about it was thinking about these three things and I think one of the things that affects that automatically is working with someone else because I have a collaborative practice and there is a mass amount of discussion about say we were going to construct an image in order to fill using references that were not generated by us so you automatically start to talk about the authenticity of the image, reconstructing is a whole, something we are going through at the moment actually we are making film and we are using postcard images and they are all for Artworks so it is not an original art work it is a copy that has been translated through x amount of processes and so that in itself becomes a kind of subject for truth and non truth and I think because we work a lot with other people we are often setting things up and over your computer for 4/5 weeks or something and you are inviting people to affect a fixed amount of work that is generated the resultant work flips back somehow and questions the authenticity of what has been put into the work so if you ask people to comment you would have a conversation with someone and would say can we use an extract of what you are saying in order to put it into something other then it becomes involved with ownership as well of that fixed authenticity of the work so I think it is absolutely fascinating and I think it is really complex and I think what we strive to do is through acknowledgement to be inclusive in our practice but at the same time we don't ever acknowledge which one of us does anything so there within

that kind of envelope the practices are kind of blurring that throws up all those questions again so, I mean we could talk about this for hours but does that

J *Yeh I suppose it is like it relates to the oracle it is acknowledging the origins and the linkages that gives it authenticity isn't it*

FB *Yes but then what you do with those things is a whole other set of questions around there and then when you have done that things, and when you present it you open it up into a whole other arena as well because if you could present that to an audience they are going to reflect on that work, they are going to input onto that work even if they never say anything or open their mouth just the act of viewing will affect it again so I think this is a hugely interesting area and of course it is changed as artistic practices have changed.*

J *I suppose the whole artist play with authenticity and integrity is part of their work is part of their practice it is not something that functions out with the work it is actually embedded, interwoven and the very notion of it is part of the work.*

FB *And I think as an artist there is till a huge stigma around the whole notion of being an artist and your integrity as an artist is constantly in questions it is constantly under threat for a myriad of reasons are also out of step with you, most people have more easily definable roles and jobs and if you were to bring people off the street and ask them are you an artist or not it would be really interesting to see what kind of responses you got so the authenticity of your own practice is often under threat.*

J *I think as well I think the media and I thing this is something that has happened for a long time and I'm not talking hundred of years but there is a stereotype seems to prevail as well*

FB *Of the*

J *Yeh this kind of tortured soul, this dark tortured soul and I think that plays right into the kind of what we see the artist to be and that kind of gets in the way often enough*

FB *It is based on indivuality on being male of going against the flow, fighting against the screen all of those things and that is absolutely incredible that these are so part of the stereotypes*

J *It is probably even more unique and definable and more traditional in things like doctors and lawyers all being treated as professions that have been going for equally as long a time they probably have less definable attributes than artists do even through*

FB *Perhaps they are less accessible, most professional are less accessible I mean artist are always putting their stuff out there always asking for*

J *Well it is a kind of mid context that we probably operate in this whereas they can maybe only operate in maybe several closed context speaking. That moves nicely on the next question which is what role do you feel artist should play when they work with scan data and obviously based on what you have seen what role do you think, I mean it doesn't necessarily directed at me but*

in this domain that I operate what role do you feel the artist plays and some of they key words that have come back are, translator, some people have said mediator, illustrator and some people said it was not fair to define it all it is evolving

FB *I think it is always good at having a stab a the thing, I think those terms are they are fair comments I would say you have to beyond mediating I would say that you would have to strive to make something new and I think that is the challenge in what you are doing surely it is not just about translating information but about moving it into finding a form through your materials whatever these material are, digital to develop a language that hasn't been developed before I think that is a fantastic challenge a really fantastic challenge and I say that completely separate to what we talked about in terms of where the work should ultimately be placed should you move it to more of a gallery, just talking in relation to the question what I find really fantastic about the images is that it is really they are engaging as a visual language and that is fantastic and I think it is something that artists work with language in a different way as a visual language and of course there are millions of interoperations of that but I think it is as important to people who are not artists develop visual languages and if they are constantly confronted with new ways of being able to look at information and digest information that is fantastic.*

J *I mean it is like anyone if it is not spoken it dies, it has to be spoken and it has to multiple for it to evolve and improve*

FB *Yeh and it is about cranking it up a bit to stimulate people to really question what they are saying and how they are saying and prepare they are to accept things*

J *And it kind boils back to a thing it becomes so desensitised we have lost the like you said at the beginning lost the ability to look and some images or artists can provide the tools for people to look again and not to just judge something in two seconds in front of the TV as the*

FB *No because looking is really important it is abut reflective space and about an intellectual process and it is how you regurgitate that information and pass it on or use it as a communication tool so it is no devoid of or say it is really close to an intellectual process I think it is a skill we all possess but in many ways undervalue it.*

J *Good, last question I have which again there is no right and wrong answer, do these images affect the way you thing about your body?*

FB *Yes definitely, not so scary, no definitely I find them really intriguing and attractive as form and I would like to see more of them and more developed and I can relate them completely to a physical understanding of the body I think it is really great and I think before I cam in to day I had a kind of stereotypical view of medical data being presented in a two dimensional form way that was really difficult to interpret so it has changed it yep.*

J *I think what is really good about today is that the experiment has done what I want it is doing what I wanted it to do which was to bring out some of these deeper issues these kind of philosophical issues related to a kind of my practice and how and where my work sits and how it is evolving and it is*

value in terms of its integrity, that is really what I'm trying to tease out and it is interesting that the interviews that I've done with the patients are very different in the sense it has not been so open ended and we have not shown so many images there have only been images related to one condition and we have had a comparative, we have shown them lots of two dimensional images with a narrative like a voice over and then we have shown them lots of images so it has been very kind of controlled it is very social science model because that is really about what the ethics, we were only allowed to do that from the ethics because we are dealing with people that have quite sensitive moods and can stress them out and it has been really interesting that a lot of the patients have reacted in a similar way but in a different ways as well they have asked lots of questions at the end and they have really engaged in their understanding more about what is wrong with them

FB Fantastic

J So in the sense we have had a chat a the end of this about slightly different issues but the images again created the discussion there has not bee a kind of, a different kind of discussion but a discussion all the same and you have been equipped with some of the issues that I have been dealing with in the sense of I provided you with information, background, not that dissimilar to the patients we provided them with a series of images but in that case it makes me feel good because these people have gone away understanding more about what is wrong with them.

FB That is fantastic or maybe more empowered to ask those questions as well

J I think it is empowerment and I think that is

FB Because I think the medical profession has a phenomenal ability to disempower and that is completely bizarre as it is you as a patient, your body, you are the fodder you are the material for that science and often your place in the hierarchy is very very low and the information systems are pretty

J A lot of dehumanisation goes on and it is bringing back a bit of humanity to it all I think. Well Tracy that has been brilliant

FB It has been really interesting I have really enjoyed it.

2.15. Radiographer D

Interview with Radiographer D
Date: 23/10/06
Time: 15:30
Duration: 00:49:38

J *It is a split screen so there will be sets of images come up there won't be just one image that you look at and then another one we will put two up at the same time and on this side these will be the radiographical images these will be the images that are taken from the scanners and I'll give you a bit of background to what you are looking at but I don't think you will need much of a background, I think you will work out quite quickly what you are looking at and then on this screen I'm going to put up the 3D images, the images that have been reconstructed and what they key thing to do, is I've got a series of questions that I'm going to ask you in relation to each image but just answer then the way you feel, say what you see and obviously as well don't put yourself in the position of a patient unless you really want to I mean put yourself in the position of who you are and what you feel about what you are looking at and the value of each set of images, but the questions will be pointed in that way, so I've going to start off with the first set of image which are, these are arterial images and then I'm going to put up on this screen a set of 3D images that were created from that arterial image set, and this image on the left is a kind of reconstruction of that piece of data on the right hand side and it has got a degree of interpretation in the sense that it has had texture and colour and lighting added to it but it is still relatively faithful to the 3D data that is has come from, from the 2D scan. This is an MRI which has been done at Ninewells and you know what it is, it is the head and neck and showing us the vessels that flow through the heart up to the head and neck, so maybe I'll just leave you a couple of minutes just to watch this 10 second loop as well Trudy and then I'm going to ask you some questions.*

RD *Am I allowed to ask a question?*

J *Yeh*

RD *You have taken this directly from the 3D from the source images and you have not taken it from this one from a nipped image?*

J *No it is from that. So the first question that I've got for your Trudy and there is four questions but the first two questions are linked but first of all can you describe in your own words how these image provide insight into the human body and then how would you describe the visual qualities of each of the images and feel free to make comparisons if need be?*

RD *I think that image, because I'm working in the field and I know that you have used a contrast medium to show up something on the image that you would not normally see, so that image gives you an insight into how the blood is flowing and whether there is an default in the mechanisms of flow at all, it is very difficult to get that, but looking at that one you are comparing that with that, I can see immediately if there is any stenotic ?? I can see immediately*

how the vessel must look which is really what, that is only what you are trying to do here you are not trying to look at the way it flows you are trying to make it ?? and I think that is more understandable from a diagnostic point of view than that is, you could go on and say that when we do a maximum intensity projection from that there is a possibility that we might create an artificial stenosis because we have missed ?? if we actually do it and we would assume that you can't do that

J Well that is a bit like a maximum intensity projection but I've just

RD You wouldn't cut off, you can't cut off anything from that image when you are doing them?

J Not really, unless I want to delete some stuff

RD So that is safer that image than what we do with this, I would say.

J I mean baring in mind that image has go in a sense it is relatively faithful to the 3D geometry of the vessel but obviously the rest of the stuff has been added and the colour and focal area

RD But it draws your eyes, it doesn't matter if it has got extra lighting and things like that I know that and that you have made it artificially but I know that the basic raw data is there from there so I would say that makes me confident that that is probably sensitive to diagnosis.

J Do you think that that image is, the 3D image has got more integrity or less integrity because it isn't exactly an exact translation, there is always going to be an opportunity for error as you translate something from one media to the other or do you think if just depends on what it is for, if it is for diagnosis or for patient information

RD If it for diagnosis I would be not too confident about the integrity of the image because as you say you can delete and you can miss bits or you can artificially add bits but if it was for sitting a patient down I would say, 'here is what we are going to have to do and this is why we are going to have to do it' I think it has got integrity

J What would you say about its visual quality in the way it looks?

RD I think it looks like how I would imagine the blood vessels would look because I know they would be red, I know the would be lumpy bumpy and I know they would be all different degrees of contour

J Okay and do you think this has been an enhancement is the artist providing an enhancement from the 2D data that he started with?

RD I think for a patient education point of view yes there is an enhancement but from a diagnostic point of view yes there is some degree of enhancement but it has always got to be sensitive to taking data from source images,

J I'm going to show you statics here Trudy and we will then just talk about them, so this is a still image taken from a scan and what I'm going to do is I'm going to take you through some still images, it is almost like a collection of images that have been some degree of interpretation and there has been some

additional stuff added to them which will become obvious in a second but what I'll do, I'm just going to pan through them there is four/five and I'm just going to pan through them and then we are going to stop on one and just talk about the one but I'll just take you through each one and I'm going to leave that image of the scan for reference point as that is just a still. So I'm going to leave it on this one Trudy and again I'm going to ask you similar type questions, how would you describe in your own words what insight this image provides into the human body and how would you describe the visual qualities of this particular image and obviously make comparisons?

RD *It has given much more information although I don't know about the integrity of the image because you only got this amount of information on this one and there appears to be more information on that one, so as somebody from the outside coming in and looking at that I would think, well is that a build up of a lot of images or is it directly taken from that image but I think it shows the vessels very clearly just to be animation you would probably benefit hugely from that but show them that and they wouldn't know what you were talking about.*

J *And in terms of its integrity and enhancement how do you feel this one compares to that image and some of the images you have seen already of the vessel?*

RD *I think I would be confident to raise that to say if the was something wrong with vertrible arteries and in this image I wouldn't be so confident with this but from the other images I think there is like for like.*

J *And how would you describe its visual qualities?*

RD *Well the vertribles are vessels that I am wanting to see are quite clear, the rest of it is quite blurred so you wonder what is behind that and why is it blurred, is it because it is further back or is it just because you decided to make that stand out in the fore ground.*

J *We are going to move on Trudy to the kidney*

RD *Easier than the vertribles*

J *Yeh they are quite tortuous structures aren't they. I had Sue Black in the other day and she is looking at an image and although it wasn't the radiographical images because she had them both and she is not a radiologist so she said it has taken her years to get her head round these radiographical images because she systematically disassembled the whole image and tried to, it was really cool to watch obviously she is using a vocabulary that I don't understand and the medical terminology for each component part and not only the system but each piece of anatomy and what it all means and why and she was trying to make linkages to this and say whether actually some of the ligaments in the back of the heard were actually causing some of the distortions in the flatting one on the vertrible arteries*

RD *Oh that is interesting*

J *But I was thinking it is probably more likely to be an artefact actually than, because it is a block and the block chops off it doesn't quite necessarily reach the end of the artery sometimes when you and the girls have run, they have*

taken a block which has just lost the end of the artery so you get that, sometimes you get that kind of almost drop off and you get a flattening in the 3D and I think that is an interesting point because I think there is perception that for the outsiders point of view that the radiographical images are a real truth that they are not, they are completely infallible because they are obviously in from a scientific instrument but like any scientific instrument it needs a human to operate it that sometimes misses bits and so it is not quite, I mean protocol is maybe not quite picked up everything, is that fair to say Trudy

RD *That is absolutely correct, we often make mistakes because arguing.*

J *Now this set of images here are again taken from the vascular system but they are a different part of the vascular system we are kind of moving further down from the heart towards the kidneys and this is a process called renal angiography as you are well aware, you probably did this one Trudy and this is used in the diagnosis of a condition called renal artery stenosis which is a narrowing that occurs or a blockage in the vessels that feed the kidney due to arterial plaque and this may result in a surgical intervention. The image on the left is a 3D reconstruction of the kidney, or our left taken from this scan and it has got a degree of transparency, it is very different, it is kind of very highly lit and it has been orientated in a slightly different way from the scan and I'll ask you just to describe in your own words what insight you feel these image give into the human body and some of the visual qualities that you fell each set of images have?*

RD *I think set of images shows the uptake of the contrast in the kidneys it shows how the kidney work, this image here gives me a clearer insight into how that contrast gets into the kidney and where it is stored in the kidney and what happens to it when it comes out so that one gives me much more information even as somebody who is doing this kind of work, that gives me a clearer perception of what is happening in the kidney whereas this one just gives me a perception of whether the contrast is down in time and what it is doing in the kidney because I look at that one and I am interested in, is the ?? okay have I got the contrast going down in the correct phase so that it is picked up by the renal arteries but this one gives me absolute confidence that I have and you wouldn't have got that information without that, it sounds a bit stupid doesn't it.*

J *No that is what we, it has almost confirming your craft isn't, it is showing you have done a good job because you can't build that 3D without the 2D so I mean it is interesting as well this notion of craft and ability to learn something that is takes a lot of experience to achieve these sorts of images it is not just a case of pushing buttons in MR you need a lot of, it is timing, skill, experience to acquire would you say is fair to say*

RD *Even the arithmetic to get to this stage you have got to learn how to do the sums and do the calculation and you have had to work out the sequence so that we can do a calculation based on this set of sum to get the timing right, if we injected the contrast and got the timing completely wrong we would probably get an image like the last image where there is nothing but that clearly doesn't give me a decent picture of what is going on but that does.*

J *So do you think that they have got different types of integrity, there is an integrity in this because it is a good subtraction, it is a good MR image and it shows the stenosis but equally this is a good image it has got a high degree*

of, it has got a degree of authenticity because it is reflective of that but it is maybe not, I don't know if is a different type of, it is not going to be used for diagnosis but it shows structure

RD *But it is easier to understand, it show the ?? actually and how the contrast is collected, within the collection system in the kidney so you can understand the shape of the kidney and the walls of the kidney, where we are just completely dismissing the kidney on this when you look at it but here your eye is drawn towards what is going on and size as well which is another important bit of this image.*

J *I'm going to put up another image which is very different, this is the same piece of kidney data, it is the same scan, it is the dame data that you saw a second ago and it has been lit in a very different way and it has been textured and set up and orientated totally differently, so maybe I could ask you to just comment on the visual qualities of this Trudy and what insight you feel it offers and I'll just leave that image going*

RD *To me that doesn't look any insides at all and that kind of looks like an attempt to draw ?? or something, it doesn't look like a kidney it looks like some other structure and I think it might be to do with the colour, if you had it maybe red then it might have been more convincing that is was a kidney but it just doesn't look like*

J *So do you think it has lost integrity then?*

RD *Yeh I think so.*

J *So it is not an enhancement so it has not been enhanced?*

RD *No, you would have a job convincing that was a kidney*

J *Is that because it doesn't formulate what you think a kidney*

RD *It is no what is in my head what a kidney looks like even a kidney that you see on television taken out of a body or something it doesn't relate to anything that you see, I think your colour is wrong.*

J *I'm going to jump to some other images here and I'm going to move further down the aorta to an area called an abdominal aortic anuerism which has been done on CT. so the image straight ahead is a CT scan and this is a CT scan that has been done in the diagnosis of abdominal aortic anuerism which I'm sure you well aware of as well what that is and this is a 3D reconstruction from it and this 3D reconstruction is the first level of interpretation it is an orthographic projection so it is straight ahead do there is no perspective, it has a degree of default lighting to it but there has been no smoothing, no finessing like any of the other images, it is very much as it has come off the scanner with all the artefacts and everything that goes along with taking it from the CT and maybe you can describe in your own words Trudy what insight you feel each set of images offer and then maybe describe some of the visual qualities of each set of images?*

RD *I'll take the easy one first, on that one I can see, clearly see the aorta and I can see all the calcification within the walls of the vessel but I can see the anuerism as we go down is a pretty big anuerism so the walls are obviously*

quite thin, your perception of the aorta from your ??? that it is a straight up and down thing until it gets to the pelvis but clearly that isn't straight up and down because it is moving to the side so there is a degree of curvature in that but it is difficult to see that from that image but from this image you can see how the vessel does curve it is not straight up and down image and you can see clearly that the bulging of the walls of the vessel but you can't really relate in that what that is actually doing to the vessel, you know it has got a fat bulge in it but that could just be a fat bulge but on this one you can see that the walls are clearly being stretched you don't see that the walls are being stretched on that one.

J *And do you think this has got an enhancement or a degree of integrity over and above this one or is it not difficult to compare*

RD *It has got a degree of integrity over that one because as I said this one your perception of the aorta is that is just sits there and goes down in a straight line and you have got to really concentrate to see that actually the aorta is moving so that each slice you are getting this, I think it does have a degree of integrity because you can clearly see the bulge and you can see how big it is, so from the diagnostic point of view you could say this is a large anuerism and it is below the level of the renal arteries, it is below the level of the renal artery so from a diagnosis point of view I would say from that image that patient probably needs a graft pretty quickly and it is possible to do it because you can clearly see that it is below the level of the renal arteries. I go back tot his one and I would say I can see the renal arteries so I could be confident that I could take patient to theatre so yes, I know from here that the bulge starts below the naval and that is an important point because if it starts above the level of the renal vessels you can't do anything for the patient any way, it is quite difficult because you then compromise the blood supply to the kidneys so it makes everything a bit more difficult.*

J *There are some more images here Trudy which will maybe give more insight which is from the side*

RD *You can still see quite a big bulge and looking at as a patient and I would understand that I needed surgery*

J *I mean that is lumen as well that is the inside so it must be even thicker than that.*

RD *Are there lumpy bits in that image, the calcification that you are seeing?*

J *I think it is a combination of calcification of the thrombus I think it is a bit of everything, I don't know that is just what Graeme and the ?? have told me it is one of Graeme's, it is one of Christoph's models, which ones of the scans have been using for his dynamics stuff but apparently it is a bit of calcification in the thrombus in there as well, its blood just idling and then also but you can see as well that the little dots on the pelvis they are artefacts from the CT so obviously this is the first process of interpretation and if I was then to take that on I would smooth all that off but in doing so I could be smoothing off*

RD *Disease*

J *Well yeh exactly and it is this whole compromise between integrity, authenticity and telling the story.*

RD If you just took it that they are wanting to project the idea that is a bulging ?? they didn't smooth anything off well that maintains the integrity because of its artefact, but if it is disease you need to be able to see the disease

J Well that is right, I mean that is where the whole process of integrity and collaboration work comes in that you work with the health professionals and they can decide and you can decide and it is a sort of joint decision in how we move things forward and develop this information in things that are more readable because an artefact may freak a patient out they may think that their kidneys are spiky and you have to smooth some of that out so there is all those issues, but obviously if Graeme said well that is nothing to do with the problematic area you can smooth that off, so it is this kind of process of collaboration and interaction.

RD So if you were talking to a medical person about this you could point to an area and say is this real or is it artefact then you could be confident that you could change the image.

J Well that is it and it is a process of doing and reflection and things like this help because you obviously set things up, you have the data to compare, you can talk about the issues and you sort of use this as a sort of almost like a vehicle to enhance and improve what you have already done in the past and these are the first few versions of enhancing the data and now we are getting better at it but a lot of it is down to skill and it is not button pushing and so there is this kind of process of, there is a lot of things like, you know yourself you just can't teach radiographers it just comes naturally to them and they can pick things up and they can develop things no matter what you do and there is some radiographers I'm sure that you just give up on and you know they are never going to get it

RD You get the same with artists there is a degree of skill inherent in your makeup really

J Yeh and it is almost like that that integrity that skill often can be missed it is almost like a hidden tacit knowledge of something, anyway this is an MR of some vascular data that was done at Perth Royal Infirmary and this is obviously a cross sectional slice taken of the what looks like real time but obviously that position as you know Trudy is taken over several heart cycles rather than one. On the left here this is a much, it is different from the other pieces of information because this is a bit of a hybrid of data, it is basically that is the aorta taken from a MRI scan that was done, it was the one with the stenosis in it you saw earlier but obviously the pulse hasn't been taken from anywhere that is purely interpretive that has been added as a result of looking at that so there is obviously no technical translation, there is no translation of that data apart from me eye balling that effectively and building this process of flow through the vessel to try and tell the story and as you probably well aware Trudy red blood cells are not that size they are lot smaller than that but to enhance and extenuate the narrative or the story that we are trying to tell here we have made them bigger so we are combining real data with interpretive styles and different camera views to tell the story whereas this piece of information here straight ahead is very much straight from the scan although you could argue it has got a degree of interpretation in the sense that it is not an exact replication of reality because it is several heart beats so it is the machines way of building an interpretive image as it were so I

suppose the question is Trudy maybe if you could describe what insight each set of images have and the kind of visual qualities of each one?

RD *This actually is one of my favourite images where you see the blood moving and there you can see the valves opening and closing*

J *I know it is incredible isn't it*

RD *So I always get excited when you manage to get a really decent image of this and I'm sure you get very excited when you manage to create a decent image from this but when you see the blood flow and the way it is pulsing almost I know that that is because we are taking several cycles at once and adding them together but when you see the pulsing its pulsing in the same way almost but to me it is something almost the same and I find that quite understandable how the blood is flowing through the vessels and even with the big red blood cells I think it does make it easier to understand because if you showed me that and said 'can you visualise the red blood cells within there' I couldn't I could just visualise that there is something going through there and it is just a bunch of stuff but here you look at that and you think that is definitely red blood vessels going through there*

J *And do you think in terms of enhancement and integrity one is better than the other or do you think they are just different purposes*

RD *I think they are completely different purposes but I think I like this image better*

J *The 3D one*

RD *The 3D yeh*

J *It has got a richness that maybe the other ones don't have*

RD *Your eye is more drawn to that, you could sit and look at that for ages and think right okay all it is doing is pulsing backwards and forwards but this one you can actually imagine all the little bits in your fingers and toes ??? with that one but you are not imagining it like that so it has enhanced my perception of what is happening in the body*

J *I'm going to show you two more images Trudy then we will get a seat. Now this is an MR image here a static one and I'm just going to put up these two images and maybe ask you to comment a little bit about what insight you feel these images offer into the human body and the visual qualities you feel they have or not have?*

RD *I don't think this one has any visual quality at all, it shows me that there is contrast in the aorta but there is a bit missing there probably because it is the wrong image you have used so I could misinterpret that as a stenosis in the renal arteries it comes off because there is a bit missing but I know because I do this that it is the wrong image, you need to come further over, it doesn't give me any information, none at all. This one here having seen the previous image I know it is red blood cells but had I not seen the previous image I wouldn't really have known what it was, but having seen the previous image I know that is a whole load of red blood cells, it is visually pleasing, I would put a frame on that and put it on the wall of the living room but neither of these images gives me any information at all about disease process*

J *So do you think their integrity is quite low then or*

RD *Yeh*

J *But you think that one has got a visual quality there?*

RD *That has got a visual quality that you would probably, I mean even just to sit and look at it, it could make a lovely poster wouldn't it, is that awful?*

J *No not at all*

RD *It is really a very nice image and I like the way that the colour becomes more intense as it comes to the side, so you feel that there is something coming from that light in the corner so it is as if the blood is flowing this way*

J *You could have that as a panel up on the wall*

RD *Yeh its amusement.*

J *This is the last image Trudy that I'm going to put up and this is a 3D visualisation of the vessel with the renal artery stenosis, the one in the kidney earlier not of this one and it has got the 3D blood cells added, it has got a degree of interpretation of the light and it has got a transparency and maybe if you could comment a little bit about the visual quality of this one Trudy and what insight you feel it offers?*

RD *Well it shows me where the red blood cells are, I like the lighting round about it so you can see the edges of the vessel that is visually pleasing but I can see the edges of the vessel and I can see how the blood is flowing, again because there is a light at this end and it is all red at this end I can imagine it is coming down this way, I can see how all the red blood cells are squashed in that stenotic areas so I can see that that would limit the blood flow as it goes through into the kidney so that has an integrity that image*

J *So do you think it has both a visual integrity, a sort of aesthetic integrity and a functional?*

RD *I think visual and it has got a function. If I was showing it to a patient I would prefer that the vessel was upright and I could see the stenosis*

J *You feel it is not orientated?*

RD *Because it is not orientated to the way that I am trying to show a patient here so it is very difficult to say to a patient, 'imaging this picture was on its side this is what you are seeing' so it would be easier from an educational point of view to turn the image round.*

J *Good well Trudy that is this part of the test over, you have passed*

RD *I've passed have I*

J *That is great, that is really good.*

RD *Do we get to read your results?*

J *If you want you can read my thesis yeh, if you can stomach it, obviously I'll anonomise it.*

RD *I really didn't like that kidney the white one, the white kidney I didn't find that soothing.*

J *That's all right as there are not right and wrong answers Trudy it is not, in some ways I'm evaluating my images but I'm trying to gain some other insight which I will tell you about in a second.*

RD *Because young people have been exposed to more of this kind of imagery that somebody my age as this is a new thing for me.*

J *I don't know that is weird it is what you think but sometimes it is actually we all watch television and we are all exposed tot his sort of visual imagery it doesn't matter what we do and fair enough if you weren't to watch television then I could see but in actual fact I'm finding that so far people are saying and reacting in different ways but they I don't think it is because of the visual intensity of it they are just judging it because it is in this context you are not in a hospital and it is not, people are less inhibited, they are looking at it properly*

RD *Yeh from an artistic point of view*

J *And relating a science to the art and I think that is important, I mean what I want to do Trudy I want to ask you four more questions but before I do that I just want to talk to you about the origins of the images and I'm going to show you, I call this table the origin tables but this relates to where things have come from, so I think integrity and the way you evaluate an image is often about the where it has come from and the more you find out about how it was made the more integrity you often attach to it and that goes for scientific and art space stuff and so it is often the story behind the images is as important as the image itself so I just want to show you some stuff on this table that relates to what I do Trudy. I just want to start off at this end as this is the more obvious end but obviously I started with anatomy because I need to know what I'm looking at and obviously you will give me these scans but I need to orientate myself in the body, I need to get a feel for what it is and where is goes and what it does in that respect but what is quite interesting is that I didn't know this until recently but this is an interpretation of the human body and this isn't absolute and all different types of anatomists offer different types of interpretative and in actual fact these are all obviously idolised, not idolised but these are the kind of ideal situations, ideally the heart would look like this but in reality if you were to cut everyone open and look and see it doesn't because everyone is different and you must find that when you are scanning, things like different shapes, sizes and so anyway I use that as a start point and obviously there is a historical history of illustration of art of the body and these sorts of book as great to look at how historically artists have illustrated the human body, this sort of thing and some of these are pretty morbid, you would never really want to show a patient something like that but equally it is funny that a lot of these images historically have been done to tell a story, different stories, different times in history, this is the Rembrandt one called the anatomy lesson and you have probably seen that before and we have got Andrew Versallis the first publication book on the human anatomy, so they all kind of tell a story of anatomy in different ways and I suppose in some ways I'm using contemporary media to do that using computer technology to do*

what they guys did

RD *??*

J *But I love this stuff, the way things look and come from different staring points, I mean a lot of the stuff I do has a particular feel to it and I think a lot of the stuff the way visualise it aesthetically is to do with this exploration where there is a lot of black and there is a lot of bright colours and it is almost like you are staring into space, you are staring into this unknown area that non one has ever seen before, although you are used to seeing it every day, most punters have not really seen so using the visual vocabulary of how other types of scientists have described the complexity and I think if you were to look at this on a map how this has been photographed can be very different so obviously this guy is trying to give you some insight and it is interesting how much of this area replicates in the vessels in the heart, so that the vessels in the body they could be river deltas forming, they are not that dissimilar to some of these structures that you are looking at in the body and so you are using the language of photography it is absolutely useful, unseen by the naked eye, I mean look at that and that is a picture of the Mississippi delta but that could equally be when you are looking down*

RD *Everything has the same anatomical structure even like the Mississippi delta it is the same so you look at the bird skeleton, everything seems to be ??/ the basic principle, it makes you think ??? you made you design and decided this works and you stick to it*

J *It is almost like this inherent link to the world around us that we are not separate we are actually all part of it*

RD *I think you would want explanation when you looked at the stars and things like that, that is almost what this real blood, this is all what this is like it is almost like a picture of looking into space and exploring and*

J *I know a lot of these images seem to formulate especially that one, I mean another thing has been looking at light as well and how the traditional artists have used light historically like Caravaggio and Vermeer is another one and these guys are real masters in how they deal with light and illuminate really fairly benign objects and making them look interesting and creating that kind of divinely inspired, I mean Caravaggio was well ?? he was just creating some stunning imagery from fairly kind of day to day life just with lighting and that sort of like a lot of the stuff that I have done in the way it has been lit it is what brings it to life or it would just look like the images on the scanner, these are the things that can never really be achieved by a machine, these are achieved by human eye and experience and obviously things as well like dealing with yourself and Graeme and obviously there is feedback, there is drawings there is a two way communication that feeds into all of this stuff*

RD *I think the is probably a very close team work*

J *Oh yeh and that is why it is so ridiculous to move to that other room*

RD *Oh God I know*

J *Because this is what this is all about and I wanted but Graeme was really keen for Alan to just come down and see and get a feel for what this was*

about, he has been invited to this thing on Thursday to really kind of get a grasp of what we are trying to achieve here

RD *???*

J *No I don't think so and this is another one this is this heart stuff that I'm working on Trudy which you have seen already and this is it again and the interesting thing about this, this is purely interpretive this has got no foundation apart from eye balling this, so I've basically built this from scratch, there is no scientific data in that sense I've got to use the scan and this does it have less or more integrity but if is for a patient it probably more efficient in communicating*

RD *I think it has as you can see why the stenosis ??*

J *Also this image is quite interesting because you know Salvador Dali image of the crucifixion of Christ and looking down on the extreme perspective and just using the, I mean this freeze images here Trudy as well as quite interesting and this is the vascular system that has been built from scratch and I've not taken it from any scientific data but I have seen it so much now I can actually build in my sleep because I have been exposed to it and I think it is a really useful tool for communication but this is interesting and this was an image that I took at the Natural History Museum and you would say what has this got to do with medical scanning and this is where this ?? it is like an analogy of the birds there is so much light and even the way the story has been told to patients it has to have an aesthetic story to tell to relate to the real world it can't be so abstracted*

RD *It must be visually pleasing as well because if it were ?? it could be quite frightening*

J *Well that is right*

RD *So you can't afford to have something like this ???*

J *Well that is it, there has to be a visual language, grab a seat Trudy because everybody, no one wants to look at this sort of image which is and that is just too overwhelming but that is the reality of what we are imaging here*

RD *Then you look at that and you think O God that is somebody cut open, it is like the chain-saw massacre*

J *Can you spot the staple the surgical staple*

RD *Yes where is that from?*

J *It is from the Surgical Skills Unit, I manage to get some footage, we managed to have like this endoscopy stuff. The last few questions Trudy, the first thing is what would you define as visual integrity in your own practice in your own imaging, how do you define visual integrity?*

RD *I think it has got to be absolutely true I've not got to have missed a bit off the image and give, I can't have a false positive, if I've missed a bit off the image I know that that patient might goo away with a report that is says there is a block or a stenosis so it has got to be a good well achieved image and I've got*

to know a bit of what I'm doing and it has got to give the consultants confidence that they can make an absolute diagnosis so that gives it visual integrity so it is all down to skills and what you do with these skills and understanding of what is required at the end of the day.

J *So in a sense integrity from a radiographers point of vie is building imagery that you feel is as close as you can get it to the reality of the body part that you are imaging, there is no, the least amount of ambiguity as possible, so that you can't misdiagnose?*

RD *And if you can misdiagnose then I'm not doing my job basically.*

J *And in terms of what you feel, what do you feel an artists role when working with medical scan, what do you feel the role of an artist is in this sort of context working with images, working in radiology?*

RD *I think you are working, I think an artist need to be working very closely as part of the team, you have to have a huge understanding, more of an understanding of our need than we have of your needs so we are sort of using you more than you are using us and I think our needs from you are to make things visually more easy for a patient to understand and also visually more easy for somebody who is maybe not a radiologist but might be a surgeon to say that is exactly where I'm going to go and fix this bit but I can't see it on the radiograph but I can see it on this reconstructed image so I think it is helpful from that point of view as well, I mean radiographers and radiologists kind of know what they are looking at but not all of the clinicians know what they are looking at so you have got two jobs here, you have got a job to make it easy for patients to understand so that they give consent for further treatment and also to make it easy for clinicians who don't really know what they are looking at.*

J *So do you think like words like translator, mediator, illustrator are fair kind of words?*

RD *Yeh, translator is very important I would say.*

J *And do you think that these types of images affect the way you think about your body? Probably not if you have seen all of these on a day to day*

RD *I've seen these things all day to day but I think the way the blood is flowing I think has made an impact on how I see my body working because we don't just think about it in these terms the way it is pulsing through you and when you look at it you think, oh yeh you are alive you know you are, it sounds stupid eh*

J *No, but I think that is an important thing about building these things that have got animation and movement and blood flow because these bits of anatomy would be useless without that and it is a bit that seems to get forgotten because a lot of these imaging techniques takes still photographs of one point in time, they don't track movement in the sense that like the last image did the pumping heart and the more that the scanners can do that the more they are going to move imaging into the real world that people can relate to, I think that is actually quite exciting, scanners are going to be able to do that and capture that because I would never be able to build those pumping images without having something to inform it*

RD *Well you would see that from the books*

J *No, okay Trudy that is it.*

RD *I think it was a bit more complicated than we did think it was going to be*

J *Well it is quite formal in that respect, it has to be though I need to*

RD *You have to get the same kind of answers*

J There has to be some sort of consistency but that has been really useful.

2.16. Radiologist B

Interview with Radiologist B
Date: 18/10/06
Time: 14:00
Duration: 1:15:43

J *As you can see there is two screens and the one screen on the right side straight ahead of you I'm going to bring up a radiographical images, so these are the images, they are almost like looking at the raw side of the data and then although with a degree of post-processing and then on the left hand side we are going to bring up the 3D images the images that have been produced as a result and I've got a series of questions I'm going to ask you related to each set of images so without any further ado I will start. It is split into four sections and they are parallel to with one another we have arteries, kidney, aneurism and blood flow and the same on the other side so, I'm going to try and bring them all up at the same time so we can, obviously for the sake the non medical participants in this I've got an explanation on what these are but I will maybe just give you the edited version of it since you probably know before me what you are looking at but basically straight ahead of you is an MRI image performed at Ninewells and it shows the head and neck area of the body and highlighting white are obviously are the vessels that feed the oxygen to the brain, on the left hand side of the second series projected is a sequence that has been produced from that two dimensional image slice of the MRI images and this is a direct reconstruction of that piece of data however there is a degree of interpretation with things like digital lighting has been added and some texturing has been added on to it and obviously I have a lot of different camera view to focus attention on different parts of the structure and it is about a 10 second loop so I will let you look at it a couple of times and then maybe we can start to do some questions, and you can feel free to ask me questions as well if there is anything*

J *So do you mind if I ask you some questions John?*

RGB *That is fine*

J *The first question is, and this is a question for both the images and you can feel free to make comparisons, please describe in your own words what insight these images offer to the human body and how would you describe the visual qualities of each set of images?*

RGB *Well okay it is a contrast enhanced MRI angiography examination the right hand screen is the raw medical data shows a group sequence of thin slats that have been obtained to give the information, if I was to sit down and at my own pace that would give me useful information, images may not necessarily look pretty and it is probably what we call a phase wrap, a face and shoulders have been wrapped into actually the thorax as a result of too small a field of you being in the body when this images has been performed, that being said that crucial areas are the heart and grey vessels are included on the scan, that may detract from the prettiness of the scan but it is still diagnostic, I*

would myself want to window those images, shade to greyscale in other words in a work station to help me appreciation of the images but I would say from my point of view that given the right working environment I would be able to add some control of the work myself with a diagnostic dataset and that being said the only set of sequences that had been broken up of that patient there would be other images that are taken in different place and that is in the coronal plane where the body has been sliced parallel to the broad side of the body and the sagital plane that has more than the axel plane which is like the salami sausage plane and you look at those together and the combination of looking at different types of images and slight different MRI sequences each would give you some different information you would build up what the patient what there As far as your 3D displays on the left I mean it is a very beautiful image it is a very elegant picture, I would say that it is more to the aesthetic than a diagnostic beauty, I think it is always a problem when you are applying separate shading to a object, and angiographic sequence at the aesthetics sometimes seem to be over the diagnostic side and your intensity of your from radiology interpretation is that you can do as little post-processing, that being said in terms of demonstrating to a member of the public what their blood vessels look like it is a very elegant depiction and if that was to be seen in an art gallery it would be striking and a beautiful image to look at.

J And do you think John that based on this image it has shown integrity that these images have different types of integrity then?

RGB Yes I think the right side images maybe like a raw unadorned as we as radiologists like there is always you have to determine where the integrity comes in I mean the MR images are a result of complex mathematical algorithms giving full lead tot he images that we see and that process say to me, the MR manufacturer has their own processing algorithms that they apply to the MRI images that we look so there is no such thing as a pure MR image it is visual manifestation of the MR physics, the image they provide thereof and the algorithms and the mathematics that the mathematicians have chosen and that being said, you know most manufacturers will turn out images that turn out quite similar and they are comparable and we would say that for diagnostic purposes you want to do those processing, what we say sometimes we are doing a volume rendered examination which is more to the left and the less complex can help and the appreciation of the 3D incepts with a complex sort of structure like an artery

J Do you think that from what you said John that there is a degree of interpretation obviously to the MR and obviously it is reproducible and measurable interpretation as a degree of

RGB I would say so, I mean every patient is different and every scan is different and that sequence you have shown there you would get a very similar picture from any number of patients who come for a similar examination, obviously everyone will be different, everyone's anatomy is different everyone's anatomy is different pathologies and one more heart and arteries will be diseased to a greater or lesser extent for different patients but you the have a degree to reproduce another take I would say that the image you provided on the left is it more a one off it is unique it is your results of honing that CT data and applying it to your photo processing and your artistic techniques

J Sure, sure and do you think one then is an enhancement of the other or one is just an interpretation of the other?

RGB I think one is a complement to the other, I mean there is a great deal of work and that said it is also horses for courses I mean if you wanted to show a member of the public what it would look like by choosing the picture on the left and then you wouldn't expect a member of the public to making a diagnosis from his images and maybe that member of the public wants more information to show him what like him have first then I would show data from it was derived.

J And in some ways then it become most important when these things work in parallel.

RGB I would think so yes.

J It is almost like the story versus the sign

RGB I don't know, I think a story versus the syntax and the grammer.

J We are going to slow things down a bit John and this is, I'm going to put up some static imagery, these are from this Bluetooth with the minimac, I'm going to play a series of images, there is a collection of images there are three or four well five images here and I'm going to keep that as sort of a reference point, I am just going to look them through for a second and then I'm going to stop on one, so if you let me look then through and if you just observe them when we go through and we will talk about one particular one, one particular image. So I'm going to leave this one up here and I'm going to ask a couple of questions on this particular image and again it kind of formulates a similar structure, first of all maybe what I can ask you is what insight you feel this images offers to the human body and if you could describe some if its visual qualities and these can be negative or positive?

RGB In that particular image give you very little insight into the human body and it is 3D surface display where you are actually showing the conference of the verbral arteries….(unknown medical vocabulary used) I would only know that directly having sort of seeing what had went before em and I would say here definitely the aesthetic has compromised the diagnostic, you know in terms of aesthetics terms it is quite a pleasing image but it is merging on the abstraction here, you feel the field is smaller the depth of field is smaller and you are focusing on the sort of area where the vertebral arteries are loop round – ram's horns it is almost like cloud patterns make that look what you will, I would say that is more like a work of art rather than a diagnostic image I think the data has been so manipulated in the process that ceases to give a diagnostic image and it is more an artistic interpretation and using human anatomy as a framework for an artistic discussion.

J Sure and do you think based on what you said there is a degree of ambiguity that you might have is moving its integrity or lessening its integrity or changing it into some other

RGB Changing it to something else, I am not saying it lacks integrity but that is a piece of art and that is a piece of diagnostic radiology.

J Now we move onto the kidneys, we are going to look at some renal data, some MR, I'm just going to put up an MR sequences first of all, so the image straight ahead of you is again an MRI sequence, a cross sectional sequences

taken from a patient from Ninewells Hospital in Dundee and it was to evaluate the diagnosis of a vascular condition know as renal artery stenosis and the condition occurs when the vessels feeding the kidney become blocked or narrowed due to a build up of ?? for instance and in this case, and this may result in a surgical intervention, on the left here this is an image that has been reconstructed from that two dimensional slices and it is the kidney on our left and it has been reconstructed with a degree of transparency and a considerable amount of digital lighting to enhance the shape and form and an insight into the internal structures of the kidney based on the questions I have already asked you John how would you describe what insight you feel is provided to the human body and the comparison of the two images and how would you describe the visual qualities.

RGB *The MR image on the right is more contrasting and less appealing in many respects it is maybe the fact it is more greyscale and is fairly narrow and that is a function sequence used when you are accentuating blood flow within the aorta and the renal vessels it shows the kidneys very nicely and in that sense it is technical sequence you have got good arterial enhanced with the renal cortex it is the whole kidney and you see the aorta and its branches the renal arteries very clearly so from a radiologists point of view it is a very useful sequence and you would combine that with other data you would have on the patient and possibly another MRI sequence to determine whether that patient had renal artery stenosis, we are interpretating these but these are not using the loop all the time you would probably study the images one at a time and maybe look at changing it to greyscale and the window level of the workstation but saying that it is a nice study and the one on the left your interpretation of that data it is a very nice fiction of a human kidney, human kidneys are much transparent we know that the cortex is transparent so you have taken some artistic licence to show the various parts of the kidney ultrastrucutre and also the vessels going into the renal hilum, especially the kidneys where the vessels leave and enter where the ureter leave as well, em it is in computers that you are really showing the inside of the kidney and you are not showing what is called the palecctic system and that system that drains the urine and so in a way a large amount of the kidney anatomy is missing from that so I would say again if someone wants to know what a kidney looked like to have an idea of what is kidney looked liked in a non threatening sort of way you could show the blood supply to the kidney, that is a pretty picture, if the lead the patient to believe that is the sort of picture you would get from going on a MR scan that would be misleading, I think it might be emphasised to a patient that this is an interpretation this is a image over and above what would normally be done and again I think probably some diagnostic data has been lost form that, it is a very lovely image and I think a good choice of colours and shading and it is very appealing and I think it shows the beauty of the human answer to a body organ but as I said it appeals to my aesthetic side rather than my diagnostic radiology side.*

J *Do you think them this is a continuation of this notion of integrity, to really get into its integrity and to make the images penetrable and make people understand what they are looking at do you think there has to be a degree of honesty about the specific images, I mean I'm talking specifically about the image I produced*

RGB *I think you have to say that it is an interpretation, it has been processed, I think that you point out that any image by nature is processed, I mean we are looking at a analogue representation of a digital and mathematical process,*

and the physical process that has happened and the choice of the greyscale and whether it is you could invoke the greyscale image and by convention still make the arteries look white and blood vessels, other structures look darker, I mean that is a convention we have adopted as radiologists but the image there is like less adorned and I would say there is more integrity I would hazard a diagnosis from the picture on the right and from your interpretation from it.

J Do you think then that in a patient context or in the Jo Public context that having explained that fact that is just taken from renal angiography and it explanation is probably vital, you are asking of context to the image rather than just purely

RGB Yes and I think also you could probably get understandable data with less processing as well, you have gone to town on that image, it is very very good but a work of art from a computer graphics is a tremendous piece of work and I think probably you wouldn't need to go to such lengths if you wanted to depict, there is much more simple software available often on the workstations now that will give you a volume rendering of that sort of with a much less, it wouldn't be so pretty to look at but in terms of showing the patient what his blood vessels look like even after the examination has been done, point to the patient where the problem is, I think that might suffice, I think if you were to looking at one for the purpose of that

J I mean to give context to a lot of these images they are kind of extracted from sequences rather than from a specific aesthetic reason rather than actually sequences in terms of value of the sequences and enhanced version of longer sequences than we have shown patients it is almost like because they were pretty to tease out this kind of notion, I think we touching also on this notion of integrity and this notion of giving origins to a medium which I think is important.

RGB Is this the same piece of data, the same kidney?

J This kidney on the left is, it has been oriented in a completely different way and it has been lit in a very different way

RGB It looks like a yellow pepper.

J So can I ask you what insight it offers in its visual qualities?

RGB Absolutely no insight at all into a kidney, the orientation that a stalk coming out of the ureter is your blood vessels has a sort of show to be sculpted artefact it is quite pleasing sometimes these sculptures might have some like something from Barbara Hepworth. In terms of diagnostic utility, zilch.

J Do you think just continuing on from what you said about sculptural aspect of it I mean how do you feel that contributes to its integrity in terms of

RGB Possibly do, it is artistic integrity, if it is aesthetic integrity there would be human highlights, curved surfaces and curves and suddenly you find that even in radiology that people are either kind of drawn to kind of structures and if you see a strange structure you look again and if it is an artefact there is something wrong with it the body doesn't have straight lines I think the human brain is tuned and also the appreciation of the human form, you would

really get a nights centuries you have formed different sculptures of art from the outside and effectively looking at shaded surfaces and in that way you are emulating that sort of aesthetic on that sort of piece of work but I think you have abstracted some data, I see that is an abstraction rather than a true representation, as a piece of art I think that is perfectly legitimate but if it was a way to educate a patient about what his or her kidney looked like from that I think that would be less integrity unless you tell the patient this is what your body looks like and it can be very beautiful and we can manipulate it and you could maybe have a thicker operative picture of the kidney and you could get it lit up from different light angles you could do similar things to that

J *I don't dispute anything you say, I think a lot of us do context and like you say as you sand among a visual piece that is very engaging but obviously because there is no value in the context of clinical explanation of what the kidney is*

RGB *I mean a huge analogy because if you are going hill walking you would use a nice ordinance survey map with lines that contour which often have more shading on an ordinance survey map more confusing it gets because the interpretation of the cartographer is getting in the way of your interpretation of your raw data and I think it is a similar analogy that applies what you do with that, I mean I think if I was hill walking I would want a straight forward map adorned with a minimal sort of representation and similar to what you see from that, that is what we look at in a general MRI sequences is a set of, side symbols, colour that we use for bark or whatever and that is very akin to the side of the ordinance survey map that you have contours, a farm, a school a pub etc whereas that obviously you have gone to town with sort of shading.*

J *I think to give you some insight how this was produced, it was produced under a purely visual sense but not to communicate anything functional in terms of almost creating intangible insight into fragility, using precious materials, but it is good that you have given me this, what you have said is absolutely right, it is gaining a different perspectives on the same artefacts which I think is important, I think the analogy of the map is good. I'll move on as I don't want to dwell too much on specific images and this is good and we can because this is all good stuff, so we are going to move on to some aneurism data something to cheer us up and this is some CT stuff and this is a CT image of an abdominal aortic, triple A, and so this is the cross section slices, now this image here is the first level of interpretation that can be achieved in terms of the processes that I use and this , it is an orthographic perception there is no perspective on this although there is some basic shading on it and there is a differentional of colour and there is no smoothing or augmentation of that image it is purely as it is an event the artefact on the bones are still there so maybe if you could just describe to me John the visual qualities*

RGB *Well the right hand screen is cross section and it is unusual in so far as for an aneurism you haven't given IV contrast that could have been done in given that particular study to enhance vessels to make them look more dense more white, maybe that was done in a subsequent sequence because I don't know whatever it would have its limits is it an acceptable examination, you are expected to see calcification in the aorta wall and you see the aneurism and you can see the surrounding structures and it is useful obviously an aneurism you are looking for dilatation of an artery or a complicated tubular structure and probably with experience with a radiologist you can get some sort of 3D*

perception itself what it would like but often for the surgeons evens from my understanding I'm not a vascular radiologist myself but for my colleagues who choose to put expanded metal stents to protective these aneurism to protect them popping they often use displays that you show on the left to help them further decide how they are going to treat than aneurism, also helpful for surgeons as well because they like to see it and having some bony structures in the background is fine, as an image, as an aesthetic image it is not particularly pretty it is not a pretty as some that has been going before but something that you wouldn't make your diagnosis primarily on that there is something else, ????? diagnosis and to help your surgical planning, I would say that image has some integrity, you wouldn't use a similar one a radiologist would ????/ of cross vascular imaging be it CT or MRI it is always looked at source data and you have seen the points for that.

J Do you think that obviously the biggest sort of, how everything sort of goes back to the original data point that this notion of truth, the truth is

RGB As far as the truth the nearest to the truth that we can get is, I suppose the truth if you like is in the digital file or the digital matrix that has been overtaken by the scanner but that is not really comprehensible to most mortals and when looking at the analogue version there of all the digital data and I suppose that is an image of the truth, it may be like the spin/ and the one on the left negatively shows some removal of data you are not getting so much information about the surrounding soft tissues but it is, from a technical point of view shows where the aneurism is and the relation to the byfication of the aorta and importantly for the stent the origin of renal arteries and great implications for treatment and you would be very surprised if that patient has a faulty back or a curvature of the spine but probably an elderly presumably male patient and there is

J Just a question for you John when people have been asking this as well luminance is that just a combination of calcification and thrombosis

RGB Not so much thrombosis it is just atharoma plaque the lining of the aorta is normally like a Teflon saucepan you have got the lining and it is very smooth and the cells like together like very packed tiles I suppose and arguably the covering of a space shuttle and what happens to the shuttle when this comes amiss but what happens is that lining gets loose it sets up local currents and you get clumps of blood from platelets and they can excite an inflammatory action and you can get the cells migrating down to fibres this issues but they can get calcified and these are called plaques and they occurs in various areas here abnormal vessels and what is shown there is really I suppose it is almost like a relief view of the lining of aorta, it is a

J A cast of

RGB A cast of the outside, the hollows there is actually what is projecting into the movement of the vessel.

J There is a few more images John that I just want to put up and you might want to add anything, these are images are the increase of the same piece

RGB I don't think, I would say that is less useful in isolation if you are looking at a loop turning round with that particular snapshot that next one is darker than

the one beforehand and that way it is slightly more aesthetic it doesn't give any more information

J *Okay I want to move on to our last set of images before we go and have a seat and these are moving images so they have a degree of animation if you like on both sides. Okay what I want to put on first of all is this heart sequence just to give you some insight but I'm sure you don't need that but these are, this is an MR cross section slice that was done in Perth Royal Infirmary and it is of the heart cycle and it is a reflection of full time and as you are aware they have been taken across several and not one particular due to the nature of the machine and the heart movement. The images on the left here are slightly more complex, in a sense that they are made up of lots of different pieces of information used to combine into one sequence, and this again it is a bit like the other images it is an extract from a longer narrative based sequence we use to show patients but this one the vessel structure that you can see is transparent is taking from an MR image of the kidney, it was basically the angiogram, renal angiogram that was done of the kidney earlier and that has been combined with these red blood cells, simulated red blood cells that were informed, their movements were informed by the movement of this but not in any direct translational sense, I've not taken any numerical readings and fed it into a system and the, it is purely eyeballed to try and replicate this feeling of motion as the red blood cells move in the vessel and the third aspect of this image is the red blood cells are purely interpretive obviously red blood cells are not this size and there is a lot more of them, but what I've doe is scaled to size and interpretive size that allows accessibility to understand as we move through the vessel, so maybe John based on our previous images you can give me some sort of insight how you feel these offer insight to the body and some of the different qualities and we will talk briefly about integrity.*

RGB *The right hand images is an absolute preview of left ventricle showing ?? valve and aorta valve during ???? that is the phase where the left ventricle the main pocket chamber of the heart fills by distally and was expelled through diastily during ?? it shows it very elegantly and I think in a way I think cardiac MR in itself is a very aesthetic examination, it is a pleasing examination to look at but also give you diagnostic data, you can if you want, this doesn't necessarily give you, this gives you idea about the anatomy of the heart and some idea of blood flow but there are certain other MR imaging techniques that could be applied to that to give you more quantative effect especially through the blood flow, this is more to look at structure, where or not the muscle of the heart will expand, whether or not there is any ?? marking of the valves or any ??? abnormal fluid, the sac the final sac, ericardium on which the heart sits in the chest cavity, and people wouldn't obviously would look at that, it wouldn't be the only imaging sequence you would do the heart, but as it stands that is perfectly reasonable and also I think pretty pretty as well.*

J *What are those fibrous things that are, obviously that is the valve that that is flapping open and shut at the top?*

RGB *Yes and those are called capillary muscles and there is, they open and close the heart valve and they have almost got like parachute cords that come up from those vessels to the edges of the valve and they help stabilise the valve when it opens and closes to that the valve doesn't fold back in on itself, there are conditions such as Comitroval Prolaspe where sometimes those capillary*

muscles don't work, sometimes after a heart attack the capillary muscle ruptures, the heart valve isn't kept under sufficient attention it is a bit like somebody loosing the guy ropes on your tent and the front flap can flap in the wind and in the heart that means that it doesn't function so effectively rather than trying to push blood into the main circulation of the blood, the blood can regurgitate and go the wrong way, so

J *And is this stuff here, what is the function of this fibres here?*

RGB *Those are the capillary muscles there, if you look the heart up, it is muscle it is just glorified muscle, heart, it is just, if you looked it up and if the lining of the heart has got these ridges these muscles that arise from the lining of the myocardium it is called and they send these send these processes up to the valves and are attached to them and that is what you are looking at there, and your MR sequence of the renal vessels with the transparent fluid, again that is of no diagnostic usefulness, in terms of patient education some of the images, the ones at the beginning of the object are I'm maybe privy to see all the presentations to be show, the ones at the beginning do give a good idea of blood flow, the latter sequence vary, you have got this sort of ??? form 2001 and I think it is pretty sort of less diagnostic I think your artistic imagination has run away with on that one and the anatomical information has been subverted somewhat obviously it is a highly schematic design of, I suppose it is a nice piece of animation and as a piece of animated art it stands on it sown I wouldn't expect that to diagnose information again I think it is your interpretation of the data and it is shows something about the aesthetic of your body and if you want to discuss the evidence of existence and all that sort of thing you could take it anyway you want.*

J *My area of radiology should be, I can see there is an internal conflict that happens, you kind of got the spike between the humanities and sciences (interference on file).*

RGB *I can see the information there with inflammatory bodies in the background, it is very pretty but completely meaningless.*

J *Well we are going to jump to an additional last two images and these are stills and that should be similar and again based on what you have seen already you can maybe describe what insight you feel these set of images provide and some of the visual qualities they provide*

RGB *Well the right hand image is slice of a communal slice from a MR angiogram examination as it stands it is of no use, it is a very thin slice and you have got vessels moving in and out of plane and there are apparent divots missing out of both renal arteries, you have apparently lost integrity with the renal artery and you and have anatomical integrity rather than artistic integrity of the renal artery but that I suspect is an artefact because you have just got one thin slice and you have taken one thin slice to a complex curving structure and you are just not including it all on that slide so that image I couldn't really make much comment on, I also would say that anatomically it is not much and in terms of I don't think you could use that as an artistic particularly it doesn't really appear to me, it is very abstract it could be, I know it is an artery and renal vessels and you have got the background noise of some of the MR artefact generated in the background by the sequence you get some magnetic feel swirling of non linear structures above the aorta, I know that is*

the aorta but I think if you were to show that to a member of the general public it would be just an abstract design.

J *It could be a view of the Amazon*

RGB *Yeh it could be one of these views of space and, what about that photographer guy, forgot the name of that photographer guy who, it could be one of those it could be a river delta or something like that, one image on its own is sort of abstracted it is different from that plane mode when you get a lot of anatomical information in one, this is one thin slice in what we call a demographics splice it is a very thing and only a representational part of the anatomy and the one on the left you corpuscles in space that is quite a pleasing, it is almost like some science fiction, the asteroid belt, you have got probably some of the MR artefacts or whatever manifests as a series of ???? of reducing intensity and then you have got shading it looks like sort of the cover of some Arthur C Clark book or something like that you can imagine the sun with the planets going round it so it is an abstract, this is an interpretation of the date, very pleasing for all that.*

J *Sure, sure, I'm going to put on another image John which is a continuation of this do you think the integrity of this one is sort of different because this is taken from an MR*

RGB *It is still difficult, I still say that it is in terms of diagnostic integrity no, you have taken it, partially shaded partially transparent display, you are looking at a renal artery but looking at it from above and obliquely again I know it is blood vessels and I know it is renal artery but you have got some structure on the background which might be the kidney on the other side but I'm not quite sure what it is infact, you can really always imagine a human form lying down it is sort of an arm up and if someone said that was a reclining female or something like that you could always be persuaded perhaps I don't know, I know my interpretation is biased as I know you have derived it from an MR angiogram database but with someone with no former knowledge of that I think you could get any number of interpretations what that represents.*

J *Sure, okay well that is end of the visual stuff and I've got all that taped so you can't take it back. Help yourself to whisky. Okay what I want to do now is just look at some of the stuff on the screens and we will have a seat and I'll ask you a few questions but before I do I just want to go through some of this stuff which is lying on the table I'm going to call this the ??? table, but just to give you some insight to it, I think origins is how they are produced and we have talked a little bit about the visual work that we have gone through but I think that has a baring on how you analyse the integrity and I think that becomes particularly increased, particularly when artists present work they often have to give the thinking behind it, the process and it is as much about the process as it is about the actual artefact they produce, infact the artefact often doesn't stand up unless there is some complex process to go on and I don't think the stuff I do is any different and I think in fact it is more prevalent because it is related to the detailed patient context you don't want o misinform patients and give them an image of something that isn't but briefly in an art gallery context scratching ambiguity is the mum, but the process I use for like what I do and how I achieve it I just want to talk about, I mean first of all I use anatomical reference points, again data, but I also use anatomy and I had to educate myself in anatomy because I can't really achieve what I wanted to, it is interesting though, you know Sue Black, Professor Sue Black the new*

professor for anatomy, she teaches anatomy to the undergraduate medics, she is really nice and was telling me something quite interesting that a lot of these anatomy books are different peoples take on anatomy, and then depending on your air of medicine she would suggest different types of anatomists or anatomy illustration to enhance because they are all better or worse at different areas of the body and then obviously someone who has not got any medical training and always had this perception that these were absolutely, far from absolute everybody deviate

RGB Well we see that, yours just get used to, what that section of normality is, I say you have got to calibrate your brain away from the normal to be taught before you know, I mean at the end it is just a matter of extreme, so we are different we can see that, everybody's chest x-ray looks different, well it is different from the inside rather than the outside, I'll bring this tube to recognise people ???? also I think people are not simply to recognise people from static image I think you recognise people from different angles and motion and

J Subtle twitches and turns that we have, it is why animation breaks down because it cannot provide that and you just know it is not real.

RGB Because the human face is not symmetrical, one side of the face is different from the other side you wouldn't look like you if you had asymmetry in the face.

J It is interesting I mean continuing on from that it is interesting working with medical visualisation, it is nothing new what I'm doing it is just more

RGB ????

J I would have said Edinburgh as well but to bring collections to Dundee and St Andrews to if you want to see if again, we were going to do the ?? I'm actually giving a talk as well but it is really fascinating,

RGB ??

J This kind of notion that he was building more than just a sum of all the parts he wasn't just trying to create ???? There was like a context to what he was presenting and he was one of the first sort of printed text was human anatomy and then you have Rembrandt and again it is communicative it is more that subtle its parts and even if you try to make specific thing and I think that is what I'm trying to do but as well as communicate

RGB ????? lights and shape

J Well I have been using Caravaggio, Caravaggio and Vermeer is the starting point of the digital lighting routs I have been developing for this work whether it be work from the artist or work, I mean I can relapse confidence and work from patients but illuminating an object and the sophistication that these kind of the artists have in the way, and what they are trying to tell us, it is pretty awesome even by today's modern standards of computer graphics and visual sculpture I mean a lot of these images were developed as a result of using that as a context using these lighting techniques to try and illuminate structures I mean I've got the scanner but obviously, it is not just like a purely research process of inspiration there is also the database and speaking to

medical staff, Trudy, Graham, yourself and the girls in MR and educating, and is that right, is that not right is that valid and I think this kind of mix of the soup sort of produces these types of images and I think it is a thing that is important to integrity that there is a hell of a lot of effort goes into achieving it is not a push button process, I mean even just taking some of these celestial images these provide a function as well these images from space and this kind of visual vocabulary that

RGB *I had a tutor once, one term he was teaching the aesthetic and he did photography ??? it may convey an image but is it much better that the figures ?????? not a picture painting information but aesthetic and I think if the subject is hard to define I suppose it is the same with anatomy textbooks you have got to, you affecting information but there is a sort of artistic licensing the veins are blue or they are blue but there are others where the veins are greyish and the arteries aren't bright red and the nerves aren't yellow, nerves aren't yells nerves are a sort of wishy washy grey colour but there is artistic licence and there could be structure in the text and there are good medical artists as well as bad medical artists, there is a guy Frank Netta and he is famous but in many ways it is his interpretation and if you took the forces off you sort of ???? it is not pure art because it is pretty much his interpretation on it but there is some exceptions in the choice of colour, shape and I think textbook use much more garish colours, that does not appeal to me as much I prefer when it is more muted but it is not to say that, the information is still there and sometimes in anatomy a very straightforward schematic even almost a block diagram from here to here which might interest some of the best depiction, the structure is drawn in the inside of a cardboard box sort of thing to give you an idea of*

J *I mean what becomes really interesting and what goes into this work and from other projects is that when you start to introduce the scientific aspects and you combine with the illustrative and you mix them together and then you start to become not one thing or another they both camps get easy and it is like where, and then that is when*

RGB *I think ??? you could take that image as a more indicative piece of anatomy text book for this or you could stare at this picture on the left for turning out stuff like you, I mean you have got a background to protect, the artistic background and you could go either way I think you could shoot your image according to*

J *It is context isn't it?*

RGB *And I would be unhappy if I wanted some educational anatomical exhibit and you turned round with a load of stuff like you have got on the left and it is more abstract ones that you turned out, some of your images there.*

J *Do you want to have a look at these John, these images are a good example this is actually not taken from any MR and it purely based on my visual interpretation of the information I have been looking at through the heart scans and from movement and from my insight into vascular system I can actually build the stuff from there to look at any thing from the real data, I don't have to work with the real data but obviously that means it has taken to changing slightly because it is not*

RGB *????? it may be ????????*

J *Yeh you are right and one thing I want to show you here was this quite interesting structure here and funnily enough after what you said earlier this is an image from an anatomist who was here from New York that I took last year and these are the kind of notion of linking structures from the real world to the you know people have them again barbed wire appreciation of structure.*

RGB *Is this the*

J *Paper matches he uses and if you can pick those out you might make, when you are trying to tell stories about disease he might do it more efficiently then just, shall we have a seat John and I'll ask you these last two questions and we can call it a day and I'll let you get off home.*

The last, there is about 4 questions that I just want to ask and it is what would you define as visual integrity in your own practice John based on, I mean you sort of eluded to it a little bit.

RGB *I think visual integrity is within the constraints of whatever imaging technique you are doing, it is a series of images be them derived from the CT scanning or MR or a plain x-ray where the image quality is sufficient that I feel that I can make a diagnosis from, and I would expect the images to be presented to me as unadorned a form as possible which would give me the chance if I then wanted to obtain 3D volumes of what we call multiplane reformats or maximum intense projection in terms of doing various, applying various software algorithms to that data to give me more information from it which I want to be presented with is the basic data first, I would rather read the book if you like rather than being given the paraphrase.*

J *What role do you feel artists play when you are working, do you think they are translators, mediators, illustrators what role do you think?*

RGB *Artists*

J *Working specifically with scan data and the types of stuff I have been doing a radiology*

RGB *Probably a mediator aren't you, you are sort of, I think artists are meant to be in tune with the sort of, like the humanity, the sensation governed from human imagination and you make a bridge between that sort of third more fundamental description of an image and you act as a bridge a conduit between that and a patients imagination I mean we all have our different, everyone have a different perception of what their insides look like and if you can act as a mediator you would probably be seen as someone who is less threatening than a doctor often people like to talk to a third party, someone who is an interested observer and advocate, I think you could be the patients advocate in a way. I think that provided that your patient was told how much processing you had done on the image, but I think*

J *Do you think moving out of the, in one sense you have described the sort of role of what an artist should do in terms of working on a one to one with patients and being an advocate for the patient and also beings its interface between medicine the image and the patient as such a sort of three way*

interaction, do you think there is a kind of broader appeal for this sort of work that there is an appetite generally for Jo Public to really see more?

RGB *I think people have, I this there is a requirement, I think there is a fascination that people are fascinated with the human body, you only just need to see the number of medical series on TV be it fictional or real life documentaries, people are fascinated in them, I mean Robert Winston's programmes on human development they are getting massive viewing figures there is an unending fascination with the human body and I think there is a need or requirement for people to do this sort of thing so people have more understanding because there is a lot of ignorance about the human body and people think that seeing insides is seeing something gruesome and gory and if you can give them some Idea of the beauty, the aesthetic beauty of the human body I don't think there is any harm in that, I mean one role that I think could be a goer and I don't think they have explored that but it is something I would be interested in, how cancer imaging is, for some patient but not all, but some people want to know what their cancer looks like and if you could help the patient visualise the cancer and there is Leslie Walker up in Aberdeen and he has the behavioural oncology unit, he has done lots of looking at pictures in the new systems looking at patients to target themselves and think about their disease about their, and there could be a lot of role for that and tumour visualisation and even if you were to work with a patient and help them manipulate the image and see how that interfaces with their perception of their illness.*

J *It is almost as well there is a visualisation that it is not necessarily tethered to the anatomy as well*

RGB *A patient could almost manipulate the images of their disease and be helped to come to terms with it and if they felt that they could manipulate it on the screen they felt they had some control over their illness, over and above being a supine third party with doctors giving them radiotherapy or drugs or something like that, so I think that could be something I see as potential diversification of what you are doing over and above the educational consents,*

J *I think you are absolutely right I think there is definite appetite for people to want to visualise this invisible space that we all carry around with us every day and the radiologist get to see into it albeit from a diagnostic point of view but it is a bit of delve around in the vocabulary of the humanities a sort of inner space that have a certain degree of an echo system of its own, it has lakes, lochs it has rivers it has savannas that are all kind of hidden and in a micro sense and a small scale sense but it is all about perspective.*

RGB *I mean it is like Man Ray is famous of his picture of the human, heavily shaded black and white photographs of the little bits of the human anatomy but they are beautiful works but he didn't have the privilege of looking inside a live body like you have but it has been done.*

J *I suppose there is an argument, well not an argument that moving this work as well as having a one to one and a more sort of obvious transitional sense there is meta sense that it could be used in a gallery space to communicate the issues of fragility*

RGB *It has got a current vogue for video installations and using big gallery spaces like this either way it is visual arts going at the moment you are in a great position.*

J *Good John thank you for that I hope that is gave you some sort of insight in what I'm up to*

RGB *No is I very interesting*

J *That was really good actually I think we covered a lot of ground which was excellent and I'll turn the tap off so that you can talk freely*

2.17. Fine Artist C

Interview with Fine Artist C
Date: 24/10/06
Time: 10.00
Duration: 1:30:20

J *Just to explain how the work has been split up I'm going to put two images up simultaneously so I'm going to put up one scientific image and one MRI/CT scan which as been done at Dundee or Perth Royal Infirmary on this screen straight ahead and the other screen here I'm going to put up some of the 3D visualisation work which has been produced and some of the animated work and then we are maybe going to chat through and I'm going to ask you some questions, I will give you time to reflect as well so just give me a shout when you feel you have had a chance to look at the pictures and then I'll ask you a series of questions related to what you are looking at, so I'm going to put up a set of images there so I'll put up some images on this screen and this screen on the left. So just to describe what you are looking at and I'll give an explanation of each set, straight ahead of you the black and white images are an MRI scan of the head and neck area at Dundee. An MRI is a process of magnetic resonance imaging and involves you going on a table and being loaded into basically what looks essentially like a plastic tube but it is a giant magnet that allows the clinicians to see quite deep into the body and these are cross sectional images, so these are almost like slices so this is not an animation or any movement as such it is a cross sectional set of slices from front to back*

FC *All right so that is front to back*

J *And what is shows is, it shows the heart at the bottom and obviously the vessels that feed the brain with blood and oxygen going up and the areas of blood and movement are the areas that have got high signal, the areas that are bright white. The image on the left here is the same piece of data that has been reconstructed, now the image on the left has got a degree of interpretation in the sense that the shape and the form has been formed by this particular image, there is a degree of translation of that one but there is also a degree of interpretation also and obviously the colour and the lighting and there is a variety of camera moves been added to this to give you some sense of the form and so I will maybe let you look through a couple of times to let you look at both sets of the images.*

FC *When you go on the scan, the tube thing are you static or do you move?*

J *No you are static and the more you move the worse pictures they get so they actually often to hold you breath so that you don't move because it is not that fast a scan so if you move even slightly can cause a distortion of the images it is a bit like a camera with a high exposure so you are getting camera shake you are getting a bit of distortion.*

FC *Probably just the nature of how the machine looks, it looks like you are fed through as it were. You just go further into the machine depending on which party of the body they want to see?*

J *Well yeh, it depends they place you, they call it the bore, and they place you on the bore depending on what they are looking at and often they may put coils on you so they put basically pieces of plastic that they may strap round you with Velcro which are called coils but they just look like a box of plastic and basically they have got magnets in them as well, so they assist the giant the magnetic you are already in to see closer to the areas so they have got head coils they are almost like things that lock your head in position, straps across the magnets and chest coils which are again sort of pieces of plastic almost like a mesh format but just inside the plastic there is obviously the Ferris metal that assist the magnet in seeing closer.*

FC *Sound quite medieval*

J *It does doesn't it, the terminology sounds, I mean coil has all sorts of connotations it doesn't mean anything, interesting enough they don't tell the patient they call it the camera, they say we are going to put a camera on your chest which I suppose essentially true to an extent, it also stops the patient from moving I suppose as well if they have got this thing strapped on to keep you still*

FC *I suppose they are terrified as it is.*

J *Well to get something like that can take up to 45 minutes to half and hour*

FC *Is that how long it takes*

J *You are not in and out, it is not like a CT, CT when they do these, CT is more like a doughnut, CT is the one you often see on the news and things as it is easy to film and you can take a camera into the room so you can take a picture of it but you can't in these sorts of images the MRI because the magnetic field is so powerful that it would just destroy your cameras digital chip and things it would just ruin them and anything that is metal would be dragged towards the core, it is a bit like James Bond everything would fly out of your hand.*

FC *Is it similar to the way, as I've seen this kind of image in like pregnancy?*

J *No it is different from ultrasound, ultrasound as it says uses a doppler effect so it is a bit like radar in that sense and you get kind of V shape as the doppler moves around whereas this is a cross section of slices in the sense is it.*

FC *It has got a much larger feel of the view.*

J *It is similar but you get that similar quality that grainy quality but we will maybe sort of jump into the questions Paul if I may, first of all describe in your own word what insight you think either of these images or both in comparison provide to the human body and some of their visual qualities?*

FC *The information that I get from the?*

J *Yes, in terms of what insight you feel they offer into the human body, I mean obviously in some ways you have got some insight you have got outlines and then obviously you move onto this one and what insight that gives and also*

importantly how would you describe the visual qualities, I mean you have maybe alluded to that a little bit by describing how it looks a bit grainy

FC *I think the difficulty is in that it is kind of s specialised language isn't it, somebody who specialises in this kind of imagery will know and they are going glean so much more out of that than a non specialist, so for somebody who is a non specialist it is kind of intriguing to see the kind of, to think about it going through the layers through the body but it is more about seeing the shape of the body and the different sections, the kind of information that is contained within is completely abstract whereas that model is more kind of a language which is more general, you are much more used to seeing that kind of information so it is easy, much easier and accessible from a non specialist point of view I would think.*

J *And do you think in terms of integrity because some of the issues I'm trying to explore here Paul is do you think they have different types of integrity or one has got more or less integrity than the other, I suppose on integrity I would like you to, personally I relate it to authenticity, honesty and those sort of things or do you think it is difficult to make a comparison between the two?*

FC *I think they both contain authenticity because they developed well the were taken, even if they were drawn by hand from somebody's experience and knowledge and authenticity if somebody did it from memory with that kind of knowledge and strictly it would still be authentic I think it is a matter of different languages. I think also the way that we are looking at the body you could kind of ask that question about everything that you see because even this is constructed in some way, I mean how real is it?*

J *Well it is not real it is completely abstract in some senses, it is funny it has got as much, they call it post processing, but that is just the fancy way of saying interpretation than the raw data the equipment is just an instrument for measuring densities of material, proton densities of material and then it converts those measurements through mathematical algorithms and they are all different for each type of manufacturer has got different ones, one have different patents I mean they all, you go for one manufacturer from one MRI scan to another and there is not that much difference between each image, they still have got the same vocabulary and things but there are subtle differences because the machine post processes it, it interprets that raw mathematical information it collect, it has numbers into they greyscale values that you see on the screen and also as well there is a degree of interpretation of the operator of the equipment who is twiddling the knobs so I suppose it is this notion of truth and whether that is a truer image than this but it is all interpretation in a sense it is just maybe that this is a reproducible measurable piece of interpretation that can be replicated hundreds of times over with a minimum error, it is sort of standard. I'm going to move onto to some static imagery Paul this is the sort of same stuff so we are not moving away from this type of imagery we are just going to look at almost like freeze frames and what I want to do, I've got almost like a collection a grouping of images built from this and I just want to pan through them, there is about 5 of them, I'm going to pan through them on this screen and I'm going to keep this up for reference, so I'm going to pan through them and then I'm going to stop on one particular image and we are just going to talk about that one so I'll just pan through them. I'm just going to stop on one particular image and we are just going to talk about his second image here. Again the kind of questions that evolve round this issue of what insight you feel they offer and this notion*

of integrity but maybe if you could describe some of the visual qualities of this image in comparison to the image on the right and then what insight you feel they offer in particular?

FC *This compared to the other one we were looking at?*

J *Sure*

FC *This one now seems more decorative and it has kind of moved another step into an abstraction I would say.*

J *Do you think if you move an image into that further away from where it started does it loose integrity or do you think if just gains a different type of value?*

FC *I think it gains another value in that if you are looking at this kind of stuff, how much of it do you want to stay as a direct informative process, specifics are you talking about maths, if you want to keep it completely pure you could talk about it purely and mathematical terms but I think the general audience or for people who are not specialists or understand that kind of language to see it as a broader picture it might give an abstract idea of what the information is but it doesn't give specifics it might give an overarching idea or feeling that is equally important as the specifics because without that you are never going to get anybody as far as the specifics.*

J *Sure, so it is moving something beyond just assumption, it is moving it into asking kind of profound questions.*

FC *Well they are specific I think and that would get people, morons saying 'oh that is quite a graphic image as well' I think something like that image as opposed to some of the other ones from the different layers it wouldn't engage people as much it is something that you can almost see the shape of the figure.*

J *I suppose the scan has context to it you can pick out landmarks.*

FC *It is the areas aligned with the shape of the head and shoulders and I think if you took that away and left the section in the middle and I presume that bit is the central area*

J *This id further up see the little hooks at the top, that is those*

FC *So if you had just that square there linked to that so you would take away the context I would say, would that be the same, it would probably mean the same thing to the specialist but different to Joe Public.*

J *I'm going to move on to some other images no Paul if it doesn't crash again, we are going to move onto the kidney I'm going to show you some kidney images. So I will just describe to you what is in each of these images, straight ahead, this is again an MRI scan and it is again a cross section of slices so it is the same idea a cross section of slices through the kind of chest and abdominal areas and the reason this is a diagnostic scan, the reason this was done was to diagnose a condition call renal artery stenosis, which is a condition that is caused by a narrowing or a blockage in the vessel that feeds the kidneys, if I pause it at the right bit you will see where the blockage is. So you can see on the right hand side the algae bit as you go down and that is a*

build up of what they arterial plaque and that causes an narrowing of the vessel that feeds the kidney or a blockage all together and it is just about to stop blood flow to that kidney which is not good news, it is like when you hear on the TV furring of the arteries that is what that is, this image on the left is the same piece of data that has been reconstructed it is the same, this piece of data here is the kidney actually on the left and it has been reconstructed using digital techniques to give it a degree of transparency it has been digitally relit and textured in such a way that better describes the structures inside, so maybe if I ask what insight you feel each set of images provide into the human body and some of the visual qualities that these images have?

FC *Is that just that part on the right there?*

J *It is that kidney on your left, so a healthy kidney on the left.*

FC *I like the quality of that image because it has got that, whereas the other one didn't really have that kind of depth that has got a feeling of like a charcoal drawing, it is much more solid as an image.*

J *It gives insight I think if you go through it you can see all the organs you can see the lungs, you can see the liver and part of the bowel.*

FC *Even abstractly it looks like it has been hand drawn to me, it has got that quality to it.*

J *It has got a grain to it?*

FC *Yeh, I wouldn't associate that with a picture if I just saw one still life, but the 3D image it feels like it has been completely constructed it is more like futuristic and this is probably my own culture that somehow I always feel the hand drawn has much more integrity than something that is constructed in a virtual world so for some reason that quality appeals to me in terms of that kind of integrity although it is constructed in the same way because you just told me but I would have guessed it wasn't.*

J *I mean the grain effect is caused by a variety of anomalies that happened on the scan image which were due to the signal, it is almost like noise if you know what I mean.*

FC *Without that knowledge it doesn't look kike it*

J *I'm going to leave that image up for s second Paul and I'm going to put another image up here on this screen and this is the same piece of data and the same 3D starting point taken from this particular scan but it has been relit in a different way and has been constructed and set up completely differently it has a different surface texture and a different composition it has been oriented completely differently, I can maybe ask you to comment on some of the visual qualities*

FC *So that is not, I thought that was actually an object that was dead*

J *No that is purely sort of constructed digitally although it has been made to look that way if you know what I mean.*

FC *That is what is looks like to me, it looks like something has been cast, or produced in a rapid prototype of some description, so I suppose if you are given the idea that it is three dimensional you feel that it has maybe more, it is more tangible the truth to it in that respect it exists but then when you are told that it doesn't exist*

J *You get that taken away from you?*

FC *Yeh*

J *It has got more solidity to it as it feels solid but then when you found out that was a digital image*

FC *It disputes that vision*

J *So do you think the integrity of that image changed when you found it was a digital image, although part of you is telling you it is a solid object?*

FC *I think you question it because of the way it is presented as shadows lit and is suggests that it has been*

J *Do you think it gives any insight?*

FC *I think it gives an insight into the form of the three dimensional structure of the organ, I suppose if you were a patient it helps to see this, the three dimensional nature of things and it probably helped to feel that these thing were explored in that way rather than the way it kind of looks quite naive.*

J *Okay we are going to move onto another set of images that are taken from an aneurism and an aneurism I'll just explain what the scan is and what an aneurism is. So the image straight ahead is a scan image is taken from CT data so it is not magnetic resonance imaging it is CT which is a process that uses x-rays but it used x-rays to generate slices and this is of the abdominal area of the body so again it is cross sectional slices and it is used for the diagnosis of a condition called abdominal aortic aneurism which is a bulging that occurs at the bottom of the aorta which is the main blood vessel that feeds blood from the heart to the rest of the body so it is quite a life threatening condition and would require pretty much instant intervention by a surgeon that a interventional radiologist so the image on the left here is the same piece of data that has been reconstructed, it has been reconstructed in the most basic sense there is no degree of finesse in the lighting and it is a graphic projection so it has not got any perspective on it, I mean there is some basic shadow, now maybe I could first ask you Paul the visual qualities of each set of these images and what insight you feel they offer?*

FC *I always thought these slices down the body are completely fascinating because I'm kind of familiar with this thing, I thing they are great but they are also obviously packed with information.*

J *It is funny it is like when I first started using these images it was almost like I had this awe of them as well it was almost like I had never seen anything like before and then obviously the images I produce I just see them as normal that is my practice so I don't see anything out of ordinary there and you kind of get the opposite effect from the clinicians they have never seen any of the 3D quality images and it is almost like when you present it with some new*

insight. I this information is scans actually packed with information and the more you pick out.

FC *Even from the point of view of just general anatomy, the structure of the body.*

J *I mean you can pick out the aorta on that.*

FC *Is that that bit there?*

J *It is the bit next to the spine and it bulges out. It is funny the really black areas as well you see the really black and that is air, it is amazing how much of us is just air, you know these pockets and these caves inside your intestine, you can image*

FC *Full of blood every where or tissue or something or fat or but everything is padded.*

J *It is funny because the kind of grain effect that you get on this scan image is caused often by the process it is the artefact caused by the x-rays, it makes it looks like mahogany but it is not loosely but it is caused by the way the x-rays move through the tissue it creates a sort of dense and it is the machines interpretation of a tissue that is there and that get translated into this because these little pits on the pelvis, see these little marks they are not actually there that is just artefact that has been removed and translated across so there is some artefact they call it which is kind of distortion due to the process which then translates into the 3D so it would be a case of smoothing that out and irradiating some of that to manicure the image.*

FC *So you have turned that obviously the other way, about 45 degrees or whatever?*

J *Yeh that is a sort of cross sectional.*

FC *It is the aorta but it looks odd in that, it looks like is not finished or is not as you say there is no finesse but the skeleton structure is quite convincing.*

J *The pitting effect that exists at the end of that one is almost a kind of relief of the calcification that exists on the inside of his arteries, it is incredible if you em, one of the anatomists was ???? if you were to squeeze that or squeeze any part of the aorta because there is so much calcification on this you can see the calcification glows white in the inside of the tube, there are little white flares that glow inside it would crunch as it is hard it is like stone, so it is pretty grim to think of because apparently the coating of these vessels is like Teflon it is like cells all lined up on the inside of the vessel and should be sort of slick and smooth but obviously through time, bad diet and lack of exercise and probably some grey genetics that Teflon coating breaks down and becomes distorted and hard and it becomes hard and the walls start to thin, it has become quite hard, when they thin because of the pressure of the aorta it causes bulging so it is a bit like a pipe if you think a pipe down at the pressure it would start to bulge and the same thin happens, but if you have one of these it is quite dangerous so they then tend to do a thing called grafting which is basically a bit of rigging to bring those walls in again and support that.*

FC *Scaffolding*

J *Exactly. Okay Paul I want to move on to some other images here, these are more of the same ad just orientated in a different way. I want to move onto some moving information. I'll just describe what you are looking at here, I mean straight ahead of you is a cross sectional slice, now this is across time, this is a cross sectional slice, one cross sectional slice but almost time lapsed and it shows the heart sequence and this is a cross section through the heart although it is not actually, it looks like real time it is not actually real time as such it is taken, the machine can't keep up with the heart so what it does is it takes an image at one phase and then waits for the heart to beat again and takes an image of the next phase and then pieces it all together so it is almost like time lapsed, it is a time lapsed version of the heart played in real time but it obviously it is useful in terms of diagnosis and so forth and that is what it is is a diagnostic image. The image on the left is slightly kind of different in the sense that its got, it consists of various bits of data that have been combined into one sequence, the tube that you see here the vessel is basically taken from the kidney which you saw a second ago in the aorta and then the movement is a translation of, I've eyeballed just that image I've taken an understanding of that image and an observation and converted it into something that I think coveys the movement and again the red blood cells are not that size and there is certainly a lot more of them but you can visualise this in a way that is more relative to the narrative of explaining blood flow rather than the actual reality of the process because the aorta is just full of a solid liquid, a liquid that you would never see any of the particles in, so in that sense it is a combination of several different starting points, so maybe if I could ask you what insight you feel each set of images make you feel and discuss the visual quality and then discuss this issue of integrity.*

FC *This reminds me of a, difficult to image but my school biology and I remember drawing the platelets and trying to get an understanding of these platelets and the blood and the structure of the blood and how it flows, I think in terms of that, I mean that is a really good educational device because in you lessons you have working with these abstract ideas and told this is reality as such but you are understanding reality by seeing and drawing and I think that environment something like that is fantastic to get an idea about how these things work. It would appeal, that kind of language appeals*

J *Yeh it is using a different language from most diagnostic images I suppose that is quite an important point, the other was just a, it is not that we have got better or worse integrities they are just communicating in a different language and discourse.*

FC *And I didn't realise as well with the last images that we looked at, the one that was on there, the fact again that the image is taken away from this black digital space and has so many connotations to it you are also conscious or subconsciously that it becomes a different language and a different kind of and that content of integrity somehow because we have come so far in the digital world that you associate that black with I think with that.*

J *It is almost like part of the vocabulary?*

FC *Yeh. I think in that circumstance with it as a educational tool I don't think it adds as much*

J *The MRI scan?*

FC *Yeh, well it does, it has more to a specialist looking at it, and there is a beauty in it and that is another thing isn't it, do you consider the kind of ideas when you are looking at these things obviously as a scientist you don't but as an artist I think you do and I think it is a general language for an audience or the public be they sciences or arts specialists, I think that comes into to it quite a lot, it helps if things are in tune with an aesthetic sensibilities you are going to react to them and engage with them much easier than you are if something is kind of not.*

J *Do you think the artist has got some degree of responsibility also that he should deal with fairly negative pieces of scan or data or fairly life threatening processes in the body to portray or beauty in ethical implications or do you think it really depends on the context?*

FC *I think it depends on the context because I think in the board context I think it is, the idea that these things are nature, they are in a way you kind of have respect for a lot of this stuff as it is fascinating and it might not be good for the individual and I suppose on a individual context you don't want to start showing people beautiful images of the way they are going to die or something, it doesn't that look great, that is going to in a few weeks, but I think as a general understanding of things.*

J *I suppose a lot and you must find this in your own work probably, people that you work with in terms of the science and in my case the clinicians they seek beauty on a daily basis but they don't look they just see and it is almost like we get the looking glass into their world that we pick out we find the structures and harmonies and represent them and reinterpret them in a different way you know it is just they see but they don't look if you know what I mean?*

FC *Yeh.*

J *I mean I've only worked through 4 or 5 datasets in the whole space of this PhD, 4/5 scans and I've produced all this work from 4/5 scans and they see 4/5 scans a days in their daily life of being a radiologist so it is this notion of time and looking that we don't look, I mean in their context they are not, they are trying to make a diagnosis and they are not looking for pretty they are looking to make a decision so they are not looking at the same things they are not driven by the same ends but equally we d, do you think we live in a society where people don't look any more they just sort of let things wash over them and they see but they, I mean it is quite a kind of old fashioned, an old world way of thinking about things but it sort of frustrates me considering that I have maybe only worked with maybe for or five pieces of date of 3 years*

FC *Aha*

J *I think as artists time is different*

FC *But I think this is the thing that you are saying is that when you are looking at things that a broad you can get so much out of this information and this bit of information might touch on so many different levels of different things, you know it can function in all them places it doesn't have to be all of the specifics. I spoke to, can't remember who is was and I said ??? it may be*

different actually if you were a diagnostic clinician working with the coal face every day and looking at these images you have got a job to look at the particular problems or particular things in that I don't know if you look at that or whether that is all you look at but certainly I was speaking to some of the ?? and they keep all the data, even if it is like not seen to be relevant but they are aware there is an obligation to store it because they are aware that although they are looking they can't see, because there is not the understanding of what they are looking at and again there is a realisation that maybe next year or 10 years that there might be something in that data that they will be able to see and I think that is fascinating the idea that we are looking but can't see it yet because we don't have the language we don't know what we are looking at but it might be right there in front of you face and I think that is where they like to bring an artist in or where there is a role for an artist because as you say you only have to miss a day and you could say how many different layers and I think that is important because I think your cooperation is not seen as around the way but if you bring in a fresh set of eyes that are trained to look then in a way you are spotting the diagnostics, the problems you might be spotting a different look and understanding of what that actually is so I think there is, I think it is a great place.

J *Yeh it is really important as it is a looking glass that we have, we have got a specific looking glass that we can adopt, they do have it but it is interesting bringing in the likes of clinicians into this sort of arena and getting them to talk but they have not, a bit like us looking at this and trying to describe the medical terms what we are looking at we don't know what they aortic valve and C2 and C3 and the pulmonary this and there is a whole sort of discourse that they lodge into but when you look at this image they have no, apart from maybe it is a really nice image they don't have any of the vocabulary to describe what they are looking at they don't have any of the poetic language to really probe and to sort of deal with some of the issues and the issues, the images that are really aestheticised like that kidney that you thought was real but when I brought pretty all the clinicians in they are stumped at that one because the don't see the point of it so it has moved so far away from their domain that they can't, they have got no book to hang any of their vocabulary on so it has moved into a slightly different domain or language and then they just don't see, it is not that they don't see any relevance to it they just stop, it is like they don't have, they have reached the part of the road where you should need a 4 x 4 to get over it, they have got to the end of the road and the road stopped and then it was like marshland they need the 4 x 4 to pass over the marshland to get at the next part of the road, so what they do is stop and turn back.*

FC *Do they not see any value in the 3D scanning then, I mean if that was, a can as it was, do they not see any point to that?*

J *They do see the point of 3D, I mean 3D is useful to them in a sense and they do have stuff on the workstation but their all most biggest worry is for every time you translate something it looses integrity to them it is getting further and further away from the scan data so there is more chance of error and if there is more chance of error there is more chance they can make a mistake when the read it so a lot of them don't buy into it they much prefer drawing two dimensional images because they build it in their own head and they know what it means but I mean certainly surgeons and so forth see the relevance of 3D because they have to work, they are like sculptors the surgeons work in the 3D space and they are very kind of intuitive in that 3D space so they*

really like 3D but again it is an issue of integrity because it has a degree of interpretation on it, it is not seen as it is moving in the scientific domain it is something else. I think a lot of this boils down to your philosophical stand point, if you think that medicine is just about nuts and bolts and about fixing people then all of this is a waste of time, it falls down but if you see it more holistically the way we understand the way we fell about our bodies is just as important and having a room filled with porcelain kidneys, different shapes and sizes and orientation can just be as valuable as explaining how blood flow moves through because people are assessing a different, a part of their brain a different way of thinking about their body space and I think that is part of the area I'm now in I started off the project thinking we need to communicate and the communication and very much the kind of design approach there has to be some sort of efficient way of communicating how things go form A to B as soon as I started to build these structures they have a kind of, their own poetics they have a language that is much more interesting than just drawing part of the information, if that is all it is about then there is not much hope for the medical profession, I mean

FC *There is also such a huge, and it is increasing all the time there is such a huge gap in knowledge and information, we get the insight of the high end of what people are doing, top level research into various problems but most people the scale of that in the newspaper or Sunday supplement magazine or something and that gap in knowledge is something that needs should be addressed because it is getting bigger and the further it gets then the more difficult it is for people in the middle to understand what is going on.*

J *It is trying to bring up this sort of middle ground thought because I think you are right there is this gap but equally there is this argument that, I mean you must find it all the time that artists are not just there to increase public understanding of sciences that somehow our skill sets can make science more digestible to the populous and that it not*

FC *And that is the sort of funding around and*

J *Exactly and if that is all it is about because there is much more profound issues that we are interested in exploring but they are really, they can't stomach that, if we are looking at the digestion analogy, as an artist ethically I don't feel comfortable making images that may involve pain and suffering to animals look palatable, so that would be my ethical stand point on working with that sort of project and I wouldn't want to make that and so, but then as an artists you would be brought into to make that more digestible and there is all these issues there is all these ethical debates of*

FC *I mean I was speaking to someone the other week about, they were talking about doing 3D modelling of animals not just of modelling a physical model but where the proteins are going to react and stuff to various drugs so if they could make the model of all the proteins and all the genes they can basically put that drug in the computer and a hundred results will come out and they won't have to test it on animals*

J *Sure*

FC *And that is the kind on inverse that they need people to work on that model visually because it is a visual model as much as it is a mathematical model and that is going to take ??? in a way, oh we have got to go through all that,*

so you could say we I'm not going to work on that because it is kind of exploited animals but in future it is going to take that away, hopefully.

J *There is a lot of ethical dilemmas as an artist when you work in these sort of environments and there is as much research to be done on that as there is in producing visual artefacts, there is a lot of ethical issues to be tackled.*

FC *I don't mind taking the work, the work that I was talking about in a way that I see it as making it more palatable for the public personally I don't mind that I would hate to see everybody doing that as it is taking away the kind of individuals perspective but there is a role for that and I don't mind the kind of idea that this is a form of illustration towards information that is being made because a lot of the work is therapy that I like and it is in that kind of trend, I love all the kind of early anatomical studies and drawings and the teaching charts that are over in the archives they are brilliant and they contain both, you know they contain*

J *I think that is it, it is having this duality, it is having this balance between the two because they have their own aesthetic it is like Gray's Anatomy it is such a drawing part of information but it was equally so ornate and it wasn't a reflection of reality at all but at the time they thought that was the truth*

FC *They still use them and I like that tradition although I don't see myself completely in it but I like to have my foot in and the other side of that is people might use this information to do the opposite and make it kind of shock, horror which I think a lot of public see it, people who just read the tabloid paper or whatever*

J *Well there is the extremities there is the perception that the press sell on what an artist should be the press need maintain that constantly of what everybody is like, and that we all want to produce we all want to be the next Damien Hurst so obviously that is mainstream the tabloids love to punt that constantly and we are all tortured souls that live on our own and don't eat properly so it is almost like a 19th century concept, it is like I don't know if you saw the Caravaggio, I mean I have always loved Caravaggio's work and it has been quite an influential in the way I light things but again it is the sensationalising of the artist of this tortured souls*

FC *A romantic idea*

J *it just doesn't really wash with me, I mean we do have families and we are normal people but it is so polarised the argument is polarised and the other end you have got Frankenstein you have got this kind of mad professor with crazy hair and there is no middle ground and like you say it is almost like dispelling those myths that it is as much about dispelling the science in-between isn't*

FC *Yeh the scientists live in the same problem, they are seen as like*

J *They are normal people too, they go to Tesco they have a life*

FC *(Laughs)*

J *But they are seen as these boffins that have no social skills and it is just, I don't know maybe we will grow out of that.*

FC *But that tradition of illustration appeals to me more than the other*

J *I mean I've very much in that camp as well Paul I mean but I'm still sort of undecided I'm sort of teetering on the edge can we move the sort of pendulum a little bit more because I'm probably too far the illustration now than I was and I'm moving the pendulum a little bit more to the abstracted with a bit of ambiguity to give a degree of space round my work I think that is what the problem is, it is almost like giving yourself space to breathe because if you present everything in the piece then you would have no space to breathe you have no space to be who you are an put your own mark on things I think, it is often, and I think that is the sorry thing what a lot of these people like Gray's Anatomy and so forth a lot of these kind of enlightenment period as well they did have that ornate ornamental feel to their work that they produced. I had this chat with Tracy McKenna the other day, like this notion of the guys in the trenches taking poetry or reading poetry it is this, I think in that day there was, it was felt that arts brought you closer to sophistication and closer to something that you aspired to be, you could understand and now we have come full circle that no one can penetrate contemporary often and Joe Bloggs can't and they can't penetrate science either and some have just given up.*

FC *It is strange.*

J *I'm going to finish up on a couple of images as this is really good stuff apart from the fact that the beer guy came and probably didn't, you will probably pick only half of the. I have got two, no I'm going to show you three images actually, so this again is an MRI scan of the aorta and this is inside the aorta and these are almost like two streams and I would maybe just ask you to comment a little bit about visual qualities and integrities of this stuff.*

FC *To me this scan looks like it is some kind of primitive, caveman like kind of drawing on the rock, some marks on the land or something, it has a feeling of past to me, you have just used it purely as an aesthetics and that like screams of like future, I think they other two they would be the impressions I would get if I have no knowledge of what they were, it is quite a contrast in a sense. I suppose that even on an information level that doesn't need any information, I suppose it looks like it could be some kind of river, tributaries or something, quite crudely done*

J *I'm just going to put up another image here Paul and this again is the same aorta it is transparent and it has got the red blood cells showing through, lit in a certain way that has shows the pinching of the artery.*

FC *You see that so me looks like, that doesn't look like anything, it doesn't look medical at all, it looks like s still from a film or something.*

J *It has got a kind of cinematic sci fi quality?*

FC *It looks like it is part of a narrative. How much of that is based, is that completely based on the real data then?*

J *Yeh that whole tube and the narrowing of and scan data obviously it has been lit and texturised differently and added*

FC So you have mixed the two?

J Yeh

FC What is the top bit

J That is the kidney, so it is almost like that, the aorta and you put it on its side like that and orientated to lie like this so that is, there would be another kidney here.

FC How did other artists respond to that, did they see the same?

J I think they liked this image in the way it looked but they saw no value to it in terms of clinical value but they liked the way it looked that seems to be the answer that is coming though. But you see their clarity is based on a different value set of things. I'll leave that up Paul and we will grab a seat. I think this notion of integrity and authenticity is related to origins and knowing where and how an image has been developed and almost like produced this is probably linked to its process or its integrity and a lot of this stuff when I get a new piece of information the starting point is obviously this, learning the anatomy and working out and dealing with and gaining some inside knowledge into the work but it is interesting these anatomy books are all interpretations as well and each anatomist has his own interpretation so these are almost like averages of what, as everybody is different, you know and obviously there is a stylised image of the heart and probably no hearts looked like that and so there is really kind of interest in notion that this is almost saying it has more validity than the abstractive but even obviously looking at it historically like you were saying Paul a lot of the early pioneers of anatomy, illustration and artists who worked they have got grotto in the background here and this guy has got a very poetic and this is seen as a fairly scientific representation of the human body but obviously at that point history it wasn't just about communicating the function but there was a sort of poetics to it. I mean the thing is as well from this anatomy lesson from my ???? it is the more of the same ball parts we know that the chap is trying to say more than just the fact that he has dissected this body and so based on that, that kind of helps inform you about the work I do, I mean like I said to you before a lot of the lighting I do is based on historical kind of painting using Caravaggio as a reference and Vermeer as well, these marvels of light and how they dealt with light and how the digital media doesn't have that sophistication so you really have to work hard to gain that sophistication because these guys, I mean that is just packed with information, I mean that is incredibly graphic and it says a lot of things but trying to bring that into contemporary media and work with it and obviously other things as well there is obviously ???? satellite imagery, spaceship imagery that has a sort of futuristic look and you can see that in quite a lot of the work I do, but it is whether that all of these influences because you are starting to go through the process of all of them they are building up some degree of abstraction building on a space between you and the individual does the image loose its integrity and a lot of the clinicians would add yeh it would it does loose it integrity because you are changing it you are modifying, I am but it is only loosing its integrity in your context but if we bring it into this broader context and this broader domain it has probably actually got more integrity than new scientific images so there is all those sorts of arguments and obviously thinks as well when you kind of work with medical staff like we do was this kind of meetings these eye chats you sort of drawing that go between and I think that is all part of the mix as an artist that works with this and having had transparency in this part of the process brings

a degree of integrity to what you do, I think often as artists designers whatever you often think this way that that is the artefact I made.

FC *I think that is part of the problem with a lot of people who have access to any ???? magic at the end but it makes it difficult for people to get to the ???? which really in my mind*

J *It is almost as if there is honesty isn't it, it is a lack of integrity*

FC *That is not, you are using the language to best illustrate it, where people who can't read it will understand it better, obviously as an education tool, it can be beautiful but also can be ugly*

J *It is funny I think what you have touched on is quite important, one thing a lot of contemporary art beauty is a swear word, you actually have to make things ugly to tell the real story of the pain and suffering and this again this cliché that to use beauty in some how passé old world and old school but surely it is another means of communication it is just another language*

FC *????? it is like almost a fear of it but everybody else uses it*

J *I think that is so loaded I think a lot of that has come from a lot of the humanities though as well, a kind of aesthetics about art historians and art theorists they are often the ones that are loathed to use these bloomin terms because they know they mean so much but surely when you are so close to the artefact to use the word beauty surely, it is difficult you are working in an ???? context you do feel yourself inhibited by the language that you use in case you build yourself up for a fall.*

FC *But particularly I mean you are looking at the nature first of all*

J *I mean the Mississippi Delta basically like the vessels and you can look at trees as well and I knew a radiographer who used to scan birds for a vets and she said that you see inside these animals and you look inside their structures and it is not that much different to our own, it was just different scales, different set or problems*

FC *???*

J *I mean there is a mathematical, I'm sure there is a mathematical golden section that sort of exists ad I know that is a simplification of it but there must be something in that. There is a couple of things here Paul that if I could just show you and it does revolve around this notion of integrity and again this is some art data that I produced at the very start, this essence of, if someone studies a lot in a field and really has an understanding of anatomy surely building something from scratch, I mean I sculpted this from scratch and this isn't based on any data so I made an image be myself and again not based on any scientific number translation, I mean the colour I have drawn it makes it fairly stylised and I that I think brings its own integrity which surely isn't any less or more than the stuff we are dealing with.*

FC *Well I think this is, well so I've been told that you are talking about a biology lesson earlier, I think when I was at school I used to really like biology one of the reasons I liked because there was so much drawing and somebody said to me and said 'that is why I became a scientist because I liked biology*

because we used to draw' and I think there is so much of that discovering through drawing through making you are educating yourself you find out how something is by the use of a pencil say, it is discovering, I think that is what, the same you would never get a clutch of that now.

J *Yeh it has been sanitised, they want to get rid of the black arts, it is almost like if you bring ??? of something it detracts from the science it sort of moves away.*

FC *But do you not find yourself when you are talking to somebody about a scientific questions inevitably the pen will come out*

J *Absolutely, I mean I have drawing that Graham does for the patients, I mean the efficiency the way he draws to patients is incredible the efficiency of communication is brilliant and he will filter through the scan and he will stylise his drawing to really say quickly what is happening and I mean I have got some of the scan upstairs that he has drawn on paper so this whole notion that science doesn't produce visuals to communicate, whereas this is quite interesting as well this is*

FC *A case you stood there and said less information ??*

J *Yeh the drawing system on a full time translation process is just another way like the computer does, I think we are just fortunate that we are running at an age and a time that in fact we pin so much hope on this protectionist approach, that was our new hope. I think a lot of people that you and I work with are currently on the other side of that they realise there are lots of other issues and I think a lot of people would like to see ??? press pushing as well, this notion that ????? the last couple of weeks you are just going to solve all our problems but spiritualism has got its place it is sort of heavy but between others, it is on the periphery a lot of people in the establishment, I mean I went to that ??? journalist and this guy came out and said we were teaching too many people to be tree huggers and that is the old school that is the old guard that was still in positions of authority.*

FC *???*

J *Can we grab a seat Paul as I need to watch time I have someone else coming in.*

FC *Where is that mammoth?*

J *That is from the Museum of Modern Art in New York and that was what informed that image, this notion of almost type of symmetry and structure but fragility is a theme that is coming through in all the work and I want to create a new series of pieces that reflect these torches/structures are really fragile and almost kind of sculptural and precious and jewel like but I'm relating it more to like porcelain and sort of fine china, they are very robust in some ways but so fragile on other ways, but the last couple of questions I have Paul are, what would you define as visual integrity in your own practice, in your own visual practice? I suppose you have touched on it a little bit.*

FC *It varies to be honest, it depends on who you are working with and what comes out of a conversation, I kind of feel that in my own mind it is all about finding out what happens next so the work is just a way on to somewhere*

else, you are playing with, you are having conversations and you are playing with images to see what happens to see what question comes out of that and to me that is integrity, it is not saying this is one thing or another, its mixing things up to see what happens. Also in a real standard sense it is kind of off that you can work with anything else and no one would ever ask you but because we are working in this field of information you wouldn't get asked that questions if you are looking at nature, looking at the landscape nature you wouldn't get asked it you wouldn't struggle with it.

J I know it doesn't really come into play it is just the given, it just comes with the territory but I think when you do multidisciplinary work and partially where you are working with science and integrity and truth is seen as the backbone the foundation to work, you are arriving an air of dishonesty but you are not

FC It is just another way of looking at the world I think.

J It is this ability to look, it is an interesting point actually that it wouldn't happen in any other, it is just because we are working in this particular domain that these sort of questions rise.

FC Also because I think it is new information, it is kind of on the edge of what we understand, I suppose that is why

J I mean that follows nicely onto the next question, what role do you feel artists should play working with this medical scan data? I think some key words that some people have said is, translator, mediator, illustrator but do you have your own word or your own take on it Paul?

FC I think it is to form another side to dialogue, it is helping basically, I mean if we all exhibit in our own disciplines all we are going to do is go narrower, narrower roads down the single track, by whatever it is to be a scientist part is to, you start to cross them over then you are asking from somebody else and also give into somebody else that opportunity to view your world, your practice as something else and I think that is the role of an artist, the role of an artist in science to look at it, particularly all this new information in a different way so I don't know if it mediator or it could be any it could be different things at different projects and sometimes it could be a mediation sometimes it could be an adjutant thing, it depends on what questions you ask what another relationship is, I suppose the rule it just to engage, engage for the world and know what is happening.

J It is funny somebody said yesterday like an advocate, you are like an advocate for the patient or the public, you are their voice their representative I suppose it depends on what context you are producing the work.

FC I don't know because, I think if you had a particular message and a particular idea about what you were doing and wanted to say then that might be the case but if you don't have a flag to stick into anything in particular and you just want to find out then I can't see, you are only advocate for yourself aren't you (laughs) you are an advocate for asking questions, an advocate for playing with the world in a visual sense. I suppose the only thing that would be an advocate for is for the visual practice to be taken seriously on that level, a language that is here and used by, traditionally by science and is of everyday, as you say the amount of images that are collected per day must be millions.

J *It is like you said before, it is like collecting every post code in London, it is not kind of similar, maybe that is too grand a scale but a similar magnitude in some ways disturbed by all these intimate like explorations of the internal body space particularly like the anatomy space which these provide but it is not shared certainly it is only accessible by a small group of people and I think science is often sometimes it is important to make a differentiation as well between scientists and clinicians as well because scientists obviously their whole world is almost bench based in a sense that they kind of, whereas clinicians are actually at the coal face they are the delivery of that science almost they have a different mindset and they often, it is interesting interviewing them they have tried to access the imagery they try to distance themselves from the scan data because they are so used to working with patients they have to distance themselves from the sciences to be able to dumb down and explain what is going on, but when you listen to the pure scientism that are often bench based they are trying to find something they are often, so it is interesting how all these different groups position themselves and how they look at the images. That kind of bring be into the last question Paul, do you these images affect you way you think about your body? Or do you keep that as a separate thing on your own*

FC *I think they affect the way you think about your body yeh, as you said earlier about the air pockets it is kind of strange to think of that spaces in your body.*

J *It is almost like an eco system there is lakes there is savannahs there is caves, I mean that's what get me going and that is why I often use this almost landscaped based imagery, cinematic landscape to kind of show they beautiful valleys and places that you can go and no one ever sees, if you look down the aorta and I didn't show them today as it is what I'm still working it is like string into the Grand Canyon it is just amazing because it is built again through the same process, pressure, time, movement if liquid obviously on a shorter time scale and we are not made of rock*

FC *Yeh but similar structures, I saw some pictures of the eye retina I think it was a few weeks ago and to look at it, the fracture a crust for some reason and then it looks through not the laser microscope but the one that they put the silver on the old microscopes and these plates that it fractures into they looked like a tree it is exactly the same pattern on them exactly the same structure so you think about all these different scales and there is probably not that many different structures*

J *Well you just need to look at the trees as the moment the trees that you see at the moment loosing their leaves are not that dissimilar to way arteries generate it is the same kind of start of the really large thick on like the aorta and then it branches out and branches out it is not that much different.*

Well that is great Paul that has been really interesting actually we covered quite a lot of ground there, I suppose there is quite a lot of synergies between you r work and what I'm doing and obviously different materials we are working with and different starting points but it is interesting just to hear you perspective on it.

FC *We could go on for ways*

J *What I might do is run a small group at some point, but there is too much happening at the moment but bring some people together somewhere just to have a seminar kind of session based on these issues of integrity because I think they are prevalent as we are working in this domain and you have hit the nail on the head, would that happen in any other with an artist working and with any other material. Thanks for your time Paul that has been really great.*

2.18. Scientist B

Interview with Scientist B
Date: 24/10/06
Time: 11.30
Duration: 1:07:55

J *Jenny the way these screen are split on one screen is the MRI data or the CT data so this is the scientific information that is used to make a diagnosis on the other hand on this screen here this is the 3D images, these are the reconstructions so this is almost like the work that has been interpreted and what I'm going to do is I'm going to put up images simultaneously so there are going to be two images up on screen at the same time and I'm going to give you context and I'm going to give you a description of what they are and then I'll maybe ask you some questions round about this notion of integrity and what you actually see in the images, so I'm going to start off with the arteries and I must add all these images are based on the vascular system so they are all taken from MRs that have been scanned various parts of the vascular system so they show arteries and not veins. So straight ahead of you here this is an MRI that was performed at Ninewells and it is a cross sectional slices through a patients head and neck and the areas of white are high signal are the arteries of blood flow and I don't know if you are familiar with MRI but MRI is a diagnostic process which involves loading the patient onto a table and then passing them through a very large magnet which you have probably seen on various TV documentaries but it is a long plastic tube that you will probably in for sort of 30 to 40 minutes while they perform the scan. The image on the left here is a reconstruction of that same piece of data so it is tethered to the scientific data in a sense that the shape is being informed by the structure of the high signal areas but other than that the other additions to it which are lighting, colour, texture and the camera moves are all interpreted and they have all been sort of digitally generated in that sense so they are not taken from this scan data I've added those things and this is a ten second loop that consists of a couple of different camera pans, so I'll maybe just let these play for a couple of seconds and then we can start. So the first question that I've got to ask you is and there are sort of four questions but the first two are related so I'll ask you them sort of in sequence so please describe in your own words what insight these images offer into the human body and also describe some of the visual qualities that these images have and feel free to make comparisons between the two sets of images*

SB *So what they tell you about the human body?*

J *Yeh and then maybe some of the visual qualities that you feel they offer*

SB *I think this one is harder to get a feel for how it fits into the human body obviously it seems like a series running vertically through the body but in terms of the blood vessels it is hard to get any feeling of how they interact and relate and sort of descriptively it has got a feeling of sort of water streaming down a wet kind of surface and white areas that are sort of sausage like but it doesn't give you a very good feel for how the vessels lie in the body at all, you have got to kind of think quite hard whereas this one*

gives you instantly a very good feel for the three dimensional aspect of the blood vessels and how they interconnect and also their thickness at any given point. So that gives you a feeling of actually very rigid tubes, they look slightly sort of plastic in a way and it looks very static whereas the sort of series there gives you much more of a feeling of movement. Yeh I think the sort of lighting effects on there are very good in the way that they give you a three dimensional feel for the tubes so overall that gives you a much better feeling for all of the arteries that are connected up to each other.

J *Do you think this is a sort of, third question, do you feel that the image on the left here the interpreted image has got less or more integrity than the scientific data that I start from, and I will maybe define integrity in the sense that it is this notion of authenticity that the scientific image is born from a kind of consistent reproducible model compared to this one which has obviously got a degree of clarity in a sense that it has been derived from the data but due to its interpretative nature do you think its authenticity of integrity has been compromised or it is just a different type of*

SB *I think it has got a high level of integrity, the only thing that I wondered about it was that is seems for the most part that it is pretty symmetrical and presumably that is the way that it is in the body but I hadn't got that feel from this image but perhaps that is just because it is actually hard to get that information by watching it*

J *You are probably right I mean the cross sectional images, I mean that is just one moment in time but often the vessels are maybe just quite sort of skewed so as it passes through it doesn't pass through them at the same time, so you get this notion*

SB *That is right.*

J *I suppose you have kind of answered this already but do you feel this is an enhancement or a dilution of the*

SB *I think a definite enhancement, you get a much better feel for how all the tubes link up whereas it is almost impossible to get it from the MRI.*

J *Okay I'm going to slow things down a bit and I'm going to bring up some static images and what I want to do it I've got a collection of images that have been produced from the scan and I'm going to keep this static up for reference as well just to compare it but what I'm going to do is I'm just going to pan through this collection of images and they have got a higher degree of interpretation than the moving one that you just saw a second ago and I'm just going to pan through each one of these and them I'm going to stop on one and we are going to talk about one so if you just bare with me and just maybe take in what you are looking at and make mental notes and then I'll stop on one of the images, the are all very similar in that sense but they do have a higher degree of interpretation. So I'm going to just leave it on this one and again the questions are going to be fairly similar for each set of images but first of all maybe describe in your own words what insight this offers into the human body and some of the visual qualities of this image?*

SB *I think that the fact that some of it is more out of focus gives you more of a feeling of depth and that it makes it feel as if the tubes that are more in focus are really coming out of the screen so I suppose again it sort of helps to give*

this feel of three dimensions into and out of the screen which you don't get at all on this image. It kind of actually just makes me think of rams horns for some reason

J *And do you think in terms of its integrity due to the focus that has been set up and the degree of maybe ambiguity that it might have, do you think its authenticity has changed or its integrity has changed*

SB *Yes, I think I would probably say yes, it feels it has got less integrity than the previous more solid one.*

J *So do you think it is an enhancement or do you think it is a dilution or is it neither of those things?*

SB *Compared to what, previous ones?*

J *Compared to the previous stuff*

SB *I would probably say, in terms of what is seem to tell you about the human body I would say it is a bit of a dilution.*

J *Okay, we are going to move on now to another set of images and we are going to move further down the vascular system to the kidneys and I'm just going to put an image up or a sequence of images up here and you have probably seen this image before*

SB *Yes*

J *So straight ahead of you on this screen here this is a MRI scan again done at Ninewells and this is called renal angiography and these are again cross sectional slices going through the body at one moment in time and this was performed in the diagnosis of a vascular condition called renal artery stenosis which is a condition that occurs in the vessels feeding the kidneys become blocked due to a build up of arterial plaque and this may result in a surgical intervention by a clinician, on the left here is the same piece of data but in particular the kidney on the left the healthy kidney on the left has been reconstructed but there is also a degree of interpretation where there has been digital lighting added, there has been a degree of transparency added to the shader to give some insight into the structures that exists within the kidney and it has been orientated in a very different way from the scan it has been orientated on its side rather than on the straight up and down so maybe if I ask you the same sort of questions again, what insight do you feel these sets of images offer and how would you describe their visual qualities?*

SB *This image is very grainy and indistinct, it doesn't really seem to offer much internal definition in the kidneys other than this sort of obviously areas that are more open and areas that are less so, it doesn't give you much of an impression of the three dimensional shape of any of the organs whereas this image does give you instantly a three dimensional feel for the kidney and gives you an idea of internal structures in there and how they are and how they relate to each other, it also gives you a much clearer impression of the vessels leaving or going into the kidney which you can't really get a feel for at all on the MRI, I mean the colouring also obviously informs you that it, there is a lot of blood in the kidney whereas you can't get that impression from the black and white.*

J *Do you think its integrity has changed? Do you think it is offering a different insight*

SB *I was slightly intrigued why you had chosen to turn the orientation just because I'm well aware that the kidneys are sort of sat in another orientation in the body, so that kind of feels a bit counter intuitive to me*

J *I mean a lot of the composition is driven by the story that I'm trying to tell which is this notion of the structure and the kind of fragility of the structure but also this almost like foetal position that is has, you get connotations and it is so organic and to be honest didn't really work in any other angle, you didn't gain that insight which is not completely non scientific but I wasn't really trying and this one I wasn't really trying to tell scientific story in some of it although it does because it gives some insight into the internal structure of the profusions that exists within the kidney but it is hard to place this image, it is an interesting images because it does have a degree of information impartment, you do get a notion of the science and it is very close in terms of its integrity to that but equally it has got a lot of other vocabulary in it which is the lighting, the texturing and the feel to it, it is on black, it does say other things I think and you can't really place it*

SB *You get a feeling that it is something outside of the body, it is a kidney not in its setting in the body it also reminds me a little bit of the brain as well the overall shape and the fact that I know it is inside but it has got this sort of uneven surface that is visible.*

J *I want to show you another image and this is the same piece of data and it has been interpreted in a very different way, it is the same kidney and it is the same scan data that I started with but again it has been orientated very differently and it has been lit in a very different way also digitally and a different texture has been applied to really tell another type of story that I was trying to tell and maybe could ask you to comment Jenny a little bit on the visual qualities and insight?*

SB *It has a much more solid feel to it, it looks like it is a definite solid body, it is sitting on a flat surface so again a kidney outside of the body, it feels it has got a sort of more plastic feel to it, as if it could have been sculpted out of plastic, it is somehow reminiscent to me of a green pepper, I know it is not green but similar in the shape and the way that the vessel comes out, it looks a bit like the stalk, it feels less alive than the red image did, definitely.*

J *Do you think its integrity has changed, do you thing it has moved so far away from the starting point or do you think it is just difficult to make any conclusion?*

SB *I think it has changed and I think it is a bit diminished from the red one, the angle is also slightly harder, it doesn't, you have not seen that classical sort of kidney shape that you might expect so that makes it a bit harder to feel that it is a kidney.*

J *I'm going to move onto another set if images which are taken from a CT scan done of an anuerism, so the images that you are looking at straight ahead are CT images and they are cross sectional slices and the CT differs in the sense that is uses x-rays to take the scan opposed to magnetic*

resonance and this is moving down the aorta towards the abdominal area, the bowel, the gut and it stops just where the aorta branches just in your groin. This image on the left here is the same piece of data that has been reconstructed just using that same piece of information, it has very little interpretation there is very little kind of finessing or lighting been added to it, it is as close as I could get, it has not perspective on is it is just an orthographic view straight ahead and it has only got a slightly different, obviously the thing that has been added is the differentiation of colour, the aorta is a deep red and the bone is sort of off yellow, egg colour so maybe if you could describe Jenny in your own words how you feel or in your own words what insight you feel these images offer into the human body and then describe some of the visual qualities in these images?

SB *I think that the CT scans makes it really difficult to give a feel of what organs and vessels you are looking at and I have to work out what anything was and I think it is really difficult to see where the anuerism is so I mean the only feel it gives you for the body is that it is overall kind of oval cross section and the fact that you have got very different organs at different heights as you go through the body but I don't think in terms of telling me anything about the disease process I think it is very difficult and the black and white are the only thing that you can really distinguish clearly are the bones which seem to be white and the other organs have a very similar colour so they are hard to distinguish or differentiate between whereas this image I think gives a very clear idea of what was wrong with the blood vessel, the fact that it was greatly distended, swollen and sort of under pressure that it is located close to the spinal column and you get a solid feel for the bones whereas the colouring obviously makes you feel that the blood vessels are full of blood and the difference in colour is very effective in terms of letting you appreciate what an anuerism is like and what it is, yeh so I think the lighting over the anuerism gives you a feel that the vessel is distended and obviously abnormal, grossly abnormal.*

J *And do you think in terms of its integrity because it has lesser of a degree of interpretation does it have more integrity or just the fact that it is efficient in communicating gives it is own integrity?*

SB *I think is does have its own integrity and that it is very good at communicating which are bones and which are blood vessels and I don't actually think it, I feel it is as effective as the previous ones that we saw in terms of the information it gives.*

J *There is a couple of other images in this sequence and I'll just pan through them and if there is anything else you want to add, these are just different perspectives of the same piece of data, the same CT*

SB *That gives you a really good feel for the bones and the spine and I think also it emphasises this distension that I saw and gives you a real feel for how close it is to the spine which is a surprise to me.*

J *I mean it is actually probably even worse than that because that is the lumen so that is almost like the*

SB *So you are not looking at the outside so that is just the space filled by the blood?*

J And that is why you get these kind of reliefs which is the calcification

SB Yeh and I suppose this one also gives you a feel for the sort of lumpiness you see on the surface which I presume is due to the deposits

J Exactly

SB I mean you can't get any idea of that at all from that one unless you studies it for a very long time

J You can see the white flares of the calcification, I mean I thought some of this was thrombus as well but the radiologist told me yesterday when I was interviewing that it is probably all calcification so the white on the scan it is a bit like the bone on the calcifications really. I mean the reason why this scan would probably have been done is to work out where exactly the abdominal aortic anuerism was and the fact that it sits below the renal artery so they can't put a stent in, not a stent a graft because they put grafts in if they are above the renal arteries because it will affect the renal function so they the radiologist yesterday was saying yeh we would be happy to perform surgery on this patient and put a graft in based on this particular scan so based on these discussions I've got to the bottom of why this scan was done

SB Okay so they were trying to work out how to proceed in terms of treatment

J Because they probably knew this chap was probably quite ill and even just listening to the radiologist speak they could work out probably how old he was roughly, it was a male, just from the scan

SB Really

J because of the anatomy and physiology

SB I suppose you kind of get in my field of work you have certain types of images that you constantly look at day in day out produced by a particular machine and you get very ?? saying that is interpretive whereas I'm not used to scans so it is like really alien to me so I can only build up a picture by sort of thinking back well that must the kidney or that must be the spine or whatever

J You almost become sort of conditioned in your own image field, it has got its own vocabulary and language like a book like you read a book it has its own particular language, vocabulary, discourse the author will have used but I think the images are just the same and obviously you can't, sometimes written in Spanish you are not going to be able to read it, you might pick out the odd work that you understand and these are not much different to be honest. I'm going to bring up some moving images now this is the last set of images, so just to describe what you are looking at her Jenny this is straight ahead of you is an MRI cross sectional slice of the heart, this isn't a series of slices going through the body this is one slice but over time and this is a kind of real time representation of the heart cycle but what is doesn't tell you and what is probably it is important to know is there is a degree of interpretation in this because this image was acquired over several heart beats because the image can't keep up with the heart, it will take one slice and then wait for the heart signal to finish and then take another slice slightly off set and take another slice until it gains enough information to get a full heart cycle so it is

almost like someones heart beat over a few seconds but it looks like one second. The image on the left is slightly more complicated in the sense that it is more complicated in comparison to some of the static images you have seen in 3D because it consists of almost three discreet parts of the data or information, one is it is the vessel or the tube that this blood is moving down is taken from the kidney scan, it is the renal artery stenosis and this is the aorta from that scan, the pushing and the pumping motion is not translated from any piece of data as such it is just informed by myself eye balling this and watching this enough to gain a feel for the movement and then like any animator converting that into something that is believable and is understandable so it is almost like an interpretation of that movement, the particles or the red blood cells are certainly not to scale, they are again interpreted and they have been grossly exaggerated and obviously the number of them is not reflective of reality but what I was more interested in this particular piece is the story, it is the narrative, so it is almost like this image in terms of its scientific start point it has no origins in one particular piece of information it is a hybrid of lots of different things, so maybe if I could asks you to describe some of the visual qualities of each one of these Jenny and what insight you feel these offer into the human body?

J *It is a heart pumping, again the actual image is not very interesting but it does give you a sense of the heart rhythmically beating and I can see where the valve is opening and closing and you get a sense of the flow of blood because the sort of colours of it change slightly as it moves through the heart. I suppose it also gives you a slight feeling of mixing because of that change in the colours while it is in the heart, so it just gives you a very flat image as if you were, well obviously it is just one cross section through the heart so it doesn't give you any three dimensional kind of feel for it at all. This one is very colourful and I think this part of it makes me feel like space actually it doesn't make me feel like it is to do with the blood vessel, I think overall it is very beautiful, the image is, the red blood cells in this one look more like sort of falling coins and they look a bit more solid whereas in the other ones they look a bit more flexible as I would have imagined they would be, I'm not doing very well her am I*

J *No, and in terms of its integrity how do you feel these images compare and what would you regard as the integrities*

SB *I feel this one obviously is*

J *The 3D one*

SB *It involves more you interpretation and ideas regarding what the circulation is like and I think I had slight difficulty because I have actually seen in the past video footage of real blood vessels with blood flowing through and I know that it is absolutely packed full of cells and they go like absolute billio so I kind of feel that in order to make images like this if they are to be a true representation of what is happening in the blood vessel it would be necessary to get information on the sort of relative speeds and I think the problem would be that if you put more blood cells in there is would be much harder to see what individual ones were doing so maybe it would lose in any case that*

J *I am going to bring up some static images just to finish off this part of the experiment. In a sense these are two extremes this is a scientific image or*

an MRI image of a clinical image of the aorta in one slice and the image on the left here is one still frame from that sequences of the inside of the aorta, maybe could I ask you to comment on the visual qualities and integrities of these and what insight they offer?

SB *I think the clinical image is not a particularly appealing image, it is just monochromatic to me it tell you very little about, I had to guess what it is, I want to get a new feel about any sort of pressure or movement that might be occurring in that blood vessel there is nothing to compare it with to know whether it is normal or abnormal so it doesn't give me much of a feel, it looks very one or two dimensional flat so I think it is not a very helpful image to get any feel about the blood flow. This one I think does give you more of a feeling of blood cells moving in side the vessel but this is the one that makes me feel it is like space, there is a large sun and these are objects of planets moving in space*

J *How do you think the integrity compares or is it just a different type of integrity?*

SB *I mean I prefer to look at that one because that I feel just doesn't do anything*

J *The 3D you prefer*

SB *Yeh so that to me would be more helpful in conveying an image of a blood vessel and blood flowing through it because the colours obviously help you appreciate that it is to do with blood and you have got a much better sense of perspective as well that the cells are moving towards you whereas there is no feel of movement whatsoever.*

J *I'm going to put up one additional last image here and I just want you to comment on this one Jenny and what insight you feel this offers and I'll just give you a bit of background, this is again the aorta and the narrowing there is the renal artery stenosis in the vessels and it has a degree of interpretation, lighting and additional blood cells have been added so maybe you could just describe*

SB *This one doesn't feel as if it has the same sort of speed of flow because the blood cells are all in the same sort of orientation, same plane of orientation so it feels much more sluggish sort of movement that might be happening in the vessel and I think it does give a good impression of the narrowing that you pointed out so that you could appreciate it that blood cannot flow so easily through that ?? it has less of a feel of blood because of the yellow colouring behind as well so it has a sort of oily or syrupy feel as well with red blood cells in it so it feel less blood like than the earlier images which were red coloured, I think that for the vessel there is a good feeling of three dimensions.*

J *Good okay, that is this part of the experiment over so we are going to just grab a seat and just take you through some other stuff and we are just going to talk about some of the issues. These tables these trestle tables what I have got on them is what I call the origin form but I think obviously the integrity and some of the aesthetic qualities of my work has been informed by something that has come from somewhere and this whole process of visualisation isn't really a translation process of going from piece of*

information to the other there is a lot if intermediate processes and activities and just to give you some insight of those that might help you answer some of these questions and see where I'm coming from is just to go through some of this and just explain to you some of the key stages that I go through when I produce some of these images but obviously the first stage is very much driven by the anatomy and understanding what it is I'm looking at based on the cross section information that I have constructed and obviously these anatomy books would inform that process but what is quite interesting and I didn't realise this till quite recently is that these again are interpretations because they are somebodys interpretation of what a heart looks like but obviously everybody is different and these are ideally that is what the heart looks like but in reality there is as much variation in a lot of these anatomical structures as there is in external structures so in a sense that is what I use for a starting point to help build some of this work, also a kind of historical starting point is quite useful because historically artists working in this domain of medical illustration is not new although the medium is very new this whole process of visualising is not new but what is quite interesting is the way that historically artists have interpreted the human body in a sense and it has been very much of its time and this is ?? one of the firsts documented anatomy books and there is a kind of grotto in the background, what he was trying to tell another story and at that time that was very much scientific truth and what we would see now is overly decorative and almost like slightly distracting but in that point in history it was seen as a, and another image that is quite useful as well is the anatomy by Rhembrandt because this is definitely is more than some of its parts it is not just telling us that this guy is dissecting this body he is trying to tell us other things and I think in some ways a lot of that goes into the work that I do I mean there is obviously there is this intimate one to one process of communication with the patients and ethically you don't want to distract from the information communication but when you are delivering some of these animations and visualisation stuff there is a definite more probing and more kind of interpretation goes on and that comes from obvious things like a lot of the stuff I do can be inspired traces back to some of the scientific exploration and how you drive something and this has got its own language and discourse, visualisation of space and exploration of space

SB Is it that sort of coloration and texture for a lot of them

J Absolutely, all this is interpretation although it ?? a science it is probing other issues related to how we feel, I mean if you didn't have that ??

SB ??

J An equally this is a delta the vessels moving through the system you start to make these linkages

SB ??

J I mean the other influences that I have had which are more historical and more related to dealing with light a lot of the stuff I do is ?? lighting is what brings it alive and what gives it its soul to it as we are often presented with the structure already and the way that people like Caravaggio and Vermeer dealt with light it is very sophisticated and I think you have ?? lots of sophistication of the soul and the story just to give a real understanding of the media they worked in, the way light behaves and that really helped me

kind of inform a lot of these images that I have produced, building images that have a kind of degree of quality to them it is just not about this plastic impartment of information and these are the images and so the reason I'm showing you all this

SB *It is fascinating actually I hadn't really thought about it and well I kind of just thought well John takes these, this data from the scans and he manipulates them into digital format but I hadn't appreciated how important your interpretation of it really was and I think, I mean I kind of appreciate that is critical and it is important and it does take it into a different sort of realm that it could be is somebody else did it who didn't have a kind of artist eye to look at it or hadn't taken all of this into account*

J *Yeh I think if you are working in digital media there is often a perception that it is a non artisan process that it is but inclusion process but effectively all you have done is substituted the pencils for digital ones and you have got the ability, you have got infinite ability to reverse and view your work so that is why a lot of artists move from traditional media into contemporary media because they have that ability and scope to make things that maybe the paint may inhibit them from doing or a sculpture but equally you are presented with as many dilemmas also, I mean even just the obvious thing like the tooing and frowing of emails that go on between the medical staff inputs to the work, so it is almost like this is the soup at the start and then produces the work and it is almost like to bring that soul to an image you have to go through all this process you have to have a reason for making it look a certain way and do a certain thing to bring*

SB *So has someone with that kind of artistic training are there people around that would try and do what I said, just take the flat stuff and try and generate three dimensional images with movement and what do they come up with compared to sort of like yourself that has tried to put a more artistic viewpoint to and I think it would be quite different and probably less helpful for people to interpret as well.*

J *I think it would be interesting to see what they would come up with and I suspect it would be very much like an interviewing approach to things it would be about this kind of minimalistic presentation of information and going toward a truth that would make sure, it would be linked to the scientific data and that would become the obsession*

SB *I think your images also they spark, they remind you of other things in every day life that you see whereas this sort of stark starting stuff I mean it just looks like medical images that don't trigger really any of the feelings or cross references of anything else.*

J *It is funny, it is just what we were discussing with Paul earlier and what was really interesting and I didn't realise this, I've only ever worked with probably about four pieces of data across the last three years, four pieces of scans, the do four scans in a morning at Ninewells, a morning and I've visualised and looked and reinterpreted and re-explored across two and a half years four pieces of data and it is this ability to look and slow time down and really break things down and chop it up and regurgitate it and break it down again and bringing your own artistic influence, it is not a criticism of science or the clinicians because it is all about context, they are driving for a medical outcome and that comes first, but it is almost like to make this link whether it*

is between Joe Bloggs in the street or between the patient and the clinicians it is almost like you have to slow things down you have to start slowing things down and start really looking, it is interesting you should say this whole sort of linking of things and references that you have in your own head about the visual because I wanted to show you these two screens because I think that fits nicely particularly if you look at this one first of all this is some examples of visual interpretive work that I have done and this is picture that I took a the Museum of Natural History in New York and it is a mammoths tusks and it was like I really liked the symmetry of it for some reason and it was an image that resonated but then it rally helped inform this subsequent image and

SB *That is very ??*

J *Exactly it is this king of relating things to the natural world and relighting*

SB *I think it looks ?? as well, I've got to go to ?? but your images will stick in my head much more but I mean ?? there is also a*

J *You can link them to something that has got reality, I mean they are so abstracted the MR images but they serve a purpose but they are just they serve a very limited purpose I suppose. I mean this is another example here and it is a purely interpretive image it is not based on any scan data it is based on this notion of like the old school, I have learned the anatomy and I've looked at the stuff and I've seen the scans and I've spent enough time now that I can actually build this and sculpt stuff from scratch so I build this almost from digital clay and then coloured it up myself just based on this one image so does that have integrity because it is not born from the scientific information it is based on my own understanding now, my own personal knowledge base, I've built and image from scratch and so there is this whole kind of, has that lost integrity?*

SB *I don't think so, I think it really adds some integrity to it, yeh I think for me it is this ability to fit it in somehow ??? but to me that makes it a bit more memorable I don't know really that is a nice image*

J *It is funny that you should say that, that view was recorded in a second the thing that inspired me and I've not finished it yet I'm still work in progress but the composition of that and the way that I have set that reminds of a, and why I built this is that I went to see the crucifixion Salvador Dali crucifixion painting you know the one of the extreme perspective, Christ on the cross that was looking down and it is two conquistadors at the bottom and so it is these kind of references in the contemporary have got of the historical work. Do you want to just grab a seat Jenny and I'll ask you, now you have sort of seen that based on what you have seen I want to ask you these questions, it is just sort of posing questions based on, the first question is more related to your own practice, what would you define as visual integrity in your own practice when you deal with images in your own professional work?*

SB *Okay so in my field it is vitally important that the image are generated solely from the experimental data and that manipulation isn't essentially allowed so the key is that it derives absolutely from experimental data, so then you, em, you know the way that you could express that is often very limited because you would be limited by the software on a particular machine that you made the measurements on or something like that so it is very little opportunity for*

any interpretation of images they are just generated automatically and that is what you have to use.

J *So that is in a sense visual integrity is about the least amount of interpretation because interpretation is seen as somehow doctoring the information?*

SB *Yeh*

J *Okay that is interesting and what role do you feel the artist should play then working with medical scan data and based on all the stuff that you have seen based on what I do, what role do you feel the artist should play based on the stuff that you have seen today?*

SB *Well I think it is important that you have put your interpretation in, I didn't actually till I'd looked at all this and gone through this I didn't think I would say that but I see now that actually it is important because I think it will make it more memorable and more meaningful to just the general public, members of the general public*

J *I'll maybe probe things that just are direct translation and make not tap into the*

SB *Yeh*

J *It is funny though when you get an image that can do both though that has got a scientific integrity and art space integrity, I mean there are very few of them exist and it is almost like you find images that do both, but I don't think, I mean all images have a degree of interpretation I suppose to an extent and the closer they get to something that people can latch onto.*

SB *I think one thing that I find a bit frustrating in science is that in my field, sort of working with molecules and a lot of how you understand molecules for me relates to their structures and how they are may interact and I find that many scientists seem to be pretty limited in the way that they can think about that and sort of generate any images that are meaningful of that and it is really quite surprising and they will write a whole paper and they won't bother to put any images in there that would explain the model of what they are truing to explain so I always make, try to include something visual in there that sums up what the overall conclusion is and it is kind of strange because in my field I'm not, I wouldn't categorise myself as a structural biologist because I don't actually collect structural data on molecules but lots of people in my field think that I am a expert in the structure of the molecules that I work on just because I have been prepared to generate images of them, so it is kind of, I don't know that is just a limitation of some aspects*

J *It is quite interesting though because I think Paul brought this up earlier and a few other people have said, well the whole language of science is a visual language it really is, it is trying to describe the natural world and in some senses and the natural work is a visible it is tactile and although we may be delving into the real kind of anatomical structures or molecular structures of these physical objects they still for them to be like say to articulate what they are about you need to draw then you need to visualise them in some way whether it is software or physical, for instance when Crick and Watson were building that mechano set of the double helix that was there way of telling*

the world, image they tried to write that down, how could you write something like that, how could you describe it and so I suppose there is that, and I suppose maybe the double helix is a good example of something that does both, it is beautiful and it is memorable but it is also good science I suppose it is like one of those middle ground images that, but that is probably been visualised in so many way as well, I remember Paul trying to describe a chromosome to me this notion of wool, it is like wool wrapped up and if you untangle the wool but using that analogy of wool you instantly bring other things up like texture like how you work with that material and there is always other issue of tactility and historically what wool is meant and so it is quite interesting, maybe science needs artists and artists need science to sort of explore some of these issues. The sort of last question I've got here is do you feel that these images affected the way you think about your body or maybe also how have these images affected you not just in your body but how have they affected you generally, as I think you commented on that a little bit?

SB *I think they have made me think blood vessels in a different way and I suppose because I've not studied anatomy formally so I found it informative to realise that vessels, where they were physically and I think your images gave a really good feel for some things and I know they will sort of stick in my mind as well so I think it is really helpful.*

J *Well that is it*

SB *Jolly good*

J *Thank you very much that has been really useful, some really good insight actually, everyone is just so different, you can imagine the scope of this it is going to be a spectrum of interpretation*

SB *How are you going to go through all of these tapes*

J *Good question, I mean I think I'm starting to pick out general patterns, I've done 19 interviews now, nearly 19 so I think I'm picking out general patterns so it seems to be things that I can pull out and I think this whole debate is really important about the relevance of what I'm doing and also the process of people have a preconception of it until they are immersed in it and really can't see what the relevance of it until they are, and I think context plays an important part as well and what is the work is for obviously it is for diagnosis but my stuff is not going to be important but I think if you are dealing with much broader issues like Joe Pubic and you are dealing with patients who need to latch onto something I think it is vital and it has got more of a relevance than the diagnostic images and I think moving up, I'm at sort at meta level from all of that is that there is a real need for artists to really engage and do this sort of research and work in clinical environments and do, I mean artists call it residency, scientists probably call it placements whatever you might want to call it about spending quality time embedded in a department and meeting people and some of the things, the best things happen through the chance encounters, it is a scientific cliché but it is just so true that you talk to someone in the coffee room, you spot a picture on a screen and it is not about this kind of mentality of lobbing a disc over the wall at each other and I'll take a disc of your images and you take a disc of mine and we will work together, it has to be about this human interaction*

SB Do you ever think of working with more on the molecular level, it is just that is what I tend to work on

J Yeh

SB And I think there is certainly a lot of scope out there for images, animations whatever to better explain a lot of the processes in the sort of immunology field that I work in and there are sort of videos and things out there but they are all very formulate in the way that they depict an antibody molecule or whatever work on, they are all very similar from one to the next and it is like as if they looked in the text book and saw this way of drawing something and you see the same in all the text books, virtually identical sorts of imagery used to represent various molecules and they are very unrealistic.

J I think absolutely, but I think they would have to be a relationship for it to be relevant to the kind of arts side, it would have to have a degree of what was it bringing to the arts and what are we exploring here, there must be broader issues to what we are exploring here rather than just explaining the mechanics of how the immune system works, it could be a struggle between two forces and there has to be kind of broader kind of issues explored rather than just exploring the mechanics I think and that is always where these sort of, but not even that I don't know if I agree with that actually and I'm probably going to contradict myself here but it is almost like find the beauty in the immune system also and finding and it might be illustrative it might be showing the mechanics of the system and finding something over and above just the process is maybe what I'm trying to say that actually

SB I would argue that there is beauty in, so my work is mainly on antibodies molecules and I think there is beauty in the way that the structure of those, the way that it is allows them and the flexibility that they have allows them to play the roles that they do and if they didn't have that form and flexibility they couldn't do what they have to do and that is quite a difficult concept even to get across to other immunologists because the instant you mention structure to most, to a lot of scientists they will just think ahh I can't deal with that

J I mean what you have just described is a great narrative of something, I've already got four/five ideas in my head of how I might interpret that what you have just described, flexibility, resilience and that ability to survive these are universal concepts that we kind of relate to the natural world and that was how I would brig that in and it is almost like you are writing a script for something and I think that is where the really interesting stuff comes, I think what you have described because you have now got an understanding of where I'm coming from and you describe what beauty mean to you and so in some ways that is the way I would approach coming in and working in that sort of work, but I just find all that fascinating and just what you have described is fascinating you know this ability that the body has and the structures, almost like a planet in itself it has got its own ecology it has got its own lakes its own continents

SB It is all sorts of different levels as well from molecules up to

J And there is so much to explore we have got so much stories to tell and it is almost been, it is funny this anatomy axe thing have you heard about this anatomy axe exhibition, it was on in Edinburgh, you must get to it, it is in Dundee now it is in Dundee and St Andrews uni, it opened last night

SB *Where is it*

J *It is in the Lamb Gallery, I've not seen it in the Lamb Gallery but I suspect it will be much smaller than the one they had in Edinburgh*

SB *Where is the Lamb Gallery?*

J *It is in the Tower Building on the second floor*

SB *Oh up there okay*

J *And I think the other half of it is in St Andrews it is split between the two unis and it is a huge collection it was on three floors but anyway they produced a catalogue and they got various people from the humanities and science to write short stories and there is a really good story about this comparing the early anatomists and sciences to the conquistadors as they explored the new world , this new paradise and the complexities of paradise and how they just trumped through and put their mark, and demolished the Sun temples and build churches on top of it and it was a new era and it is almost like we did the same then but now we are coming out the other end where we now realise that the eco system and the native indigenous people in South America have relevance and they should be preserved and it is almost like this exploration of the human body, we are at the same point, don't know, you should get along to it and I've actually got a catalogue here actually.*

2.19. Designer C

Interview with Designer C
Date: 25/10/06
Time: 10:00
Duration: 1:44:49

J *All I want to do is just bring up sets of images so I'm going to bring up almost like,I wouldn't say two extremes but the starting point for how the work that I visualised the scan data the scientific data I'm going to put up on this screen and that is a visual in its own right and then I'm going to bring up the 3D work that I constructed as a result of working with that data and I'll give you an explanation of what you are looking at so you won't be looking at a completely blind there will be some context so I will explain what they are, and then I'm going to take you through four areas, artery, kidney, anuerism and blood flow and that is replicated on that screen as well and what I want to do is show you some images on both screens and then leave you a few seconds to reflect on that on that and then maybe I'll ask you some questions. So I'll start with some artery information, and you can ask me questions, feel free to ask questions and it you want to sort of broaden out the discussion that is totally fine as well, to just to describe what you are looking at here, straight ahead of you is an MRI image, a magnetic resonance image and it is taken from a scan that was done at Ninewell and just to explain magnetic resonance imaging is a diagnostic procedure where patients are moving onto to a table and they are fed into a large plastic tube effectively that tube is a magnet and the magnet image is various things it looks at proton densities of tissue and it reflect that in a greyscale value so it has got mathematical ?? and then convert that into a value and then it can get routed into whether it be digital or film and this is, these are cross sectional slices going through a patients head and neck so it is not an animation as such it is one moment in time and it goes from front to back, just going backwards and forwards and the areas of high signal, areas that are very bright white, that is the arteries that is the highest areas of flow and that is areas of blood that are carrying oxygen up to the neck and into the brain, the image on the left is the same piece of information that has been reconstructed but it has only been reconstructed in the sense that the information is transferred from one media to the other, the geometry, the outline shape and then I've added a degree of interpretation in the sense I've added lighting, colour and a degree of texture and I have set up some camera view so it is panning round the object just to give some insight into the form and it is only about a ten second look so it gives you a few view points on the same piece of 3D, I'll just let that loop for second. So the first question Donna I'd like to ask you is, and again there can be negative or positive responses to this do don't feel inhibited in the way you react, just tell me what you think and you feel, please describe in your own words what insight you feel this set of images offers into the human and body and maybe describe some of the visual qualities of these images?*

DC *Okay I think the most striking thing is the kind of seeing the way you have it set up kind of simultaneous in a way that you can drawn parallels or a feel to draw parallels and the MRI data I think kind of is visually interesting but abstract to the point where a non expert and non kind of clinician, I find it very hard to make any sense of that but*

the only sense that I get is the sense of a body and moving back and forth because you get a shape of the kind of tissue, the kind of broad shape of the head and the shoulders which is interesting when I look at your interpretation because that makes much more sense about I think the kind of mechanism of what you are looking at but I think because it is abstract you have you have just a plain black outline I would struggle without that to see that in the context of the actual geography of the body I would see it as tissue, I think the kind of lighting kind of makes it appealing but not beautiful and not kind of any where near the kind of kind of squeamishness so I think the lighting does its job and it paints nice but I think that that the black background it is kind of removed it much further than seeing the outline of this so there is like two bits and I can see two levels.

J *Another question that I've got and it is a kind of continuation of what you have been talking about and maybe I can define it a bit more but do you fell that the image on the left the 3D image has less integrity due to its abstract nature and maybe I'll just give some background to that question because it is a fairly ambiguous question and what I mean by integrity is that in some senses the image straight ahead is a scientific reproducible and it has least amount of interpretation as can possible be achieved by the equipment but the image on the left however has a fair degree of interpretation there is some information that has been deleted, information has been added in a sense it has been, it has some digital lighting and it is obviously it has been built up to tell maybe a slightly different story, in doing so because there has been an artists intervention do you feel that the integrity has been lost because you are moving it away from possibly the raw scientific data or do you think it is unfair to make a comparison or draw any less or more?*

DC *I think what is really critical is the job, whats it fit for what is the ultimate kind of aim, completely pure and uninterpreted data has a relevance at one point of diagnosis but if you are having to communicate anything to someone who is not in that position, they are not an expert then I think there inevitably has to be a bit of human understanding, a bit of psychology and a bit of interpretation so that the receiver can understand whatever it is that you are trying to communicate and undiluted data you just couldn't do it, in fact it would probably be quite problematic so I think the notion of integrity when you are dealing with a receiver who is either the patient or you are training people who have the kind of dealing on a less clinical way I think the notion of integrity holds, you then get into questions of the level of interpretation and how far your personal stance and how far you have become subjective, I have no issue with*

J *Just maybe think it is an issue of context then?*

DC *Aha*

J *Whatever the context is will dictate the sort of degree of integrity?*

DC *And obviously being a practitioner rather than a medical expert who is confronted with this data I would kind of pose the question as to can they deal with this pure uninterpreted things and kind of handle that*

data in a similarly uninterpretive manner, I think if you can that is a rare instance, but that is just a question that comes up, yeh so I think the context and the kind of goals you are looking at in terms of dealing with this communication and understanding whatever it is they need to understand is critical to how the integrity stands.

J *I'm going just put up some static images taken from this Donna and maybe just get some insight from you, I'm going to put up this image here which is a still taken from that sequence and it is more just again to give both comparison and what I want to do is, I want to, I've got a collection of images here and what I want to do is just I want to pan, sort of scroll through them, there is 5, I'm just of going to scroll through them they have got varying degrees of interpretation but they are all static and then I want to stop on one particular one and just talk about it so if you just let me scroll through them and I will pause on each one so you have got time to look at them and then I'll just stop on one particular one and we will maybe kind of develop some of these feelings that are coming out and I want to ask you some questions. So I want to just put this image on the screen and ask you to comment on again on this on what insight you feel this image offers and maybe describe some of the visual qualities first of all.*

DC *It has a sense of depth for showing perspective I think it has got, I feel it has tone and light and texture and actually has a sense of moistness it doesn't look as if it is a dead piece, it has a sense of being alive and I think again because this is here on the one on the right it has a sense of kind of perspective and depth and thickness and fragility and strength and in a way much richer than the slice that you had,*

J *It is interesting you should say the fragility because that is one of the reasons this image was produced it was less about how to communicate the raw impartment of were these vessels were that almost gives someone an insight and sort of mental level of insight which is this kind of notion that this structures that was so reliable in a degree of they break quite easily and that is why they do these scans and it was just to sort of build on that notion for again this question of integrity, we then offer additional insight it is over and above just trying to explain what is happening in terms of the raw physicalities of the body and how it works and how do you feel that changes its integrity when you start moving into the slightly abstract and ambiguous type image, how does it foil its context.*

DC *Yeh I still think context or spectra of context are important and I mean by virtual exploring this it is with potential for disease or people who have issues or may have issues so the context is already there and I guess the ultimate goal is to get people to look after their kind of cardiovascular system and to have an understanding of what is inside and not just the object of external then I mean human psychology needs to have some metaphors or mechanism to get a hold of that is quite a large complex and technical scenario so again I think with the level of interpretation if you get that right then the integrity is still there if the goal is kind of quite explicit and it is about helping people understand what is happening.*

J *Okay there is a few other questions that I want to ask you but I'll save them for the next set of images. We are going to move further down the vascular system into the kidneys and talk a little bit about the images that have been produced from the kidney data. So just to give you some context of this Donna this image is taken from an MRI which was done of further down vascular system into the kidney, it was done at Ninewells hospital and again these are a cross section of slices at one moment in time so it is not an animation as such although it does give you a feeling of movement it is just a freeze frame almost of one moment in time and this scan was performed in the diagnosis of a condition call renal artery stenosis which is a condition that occurs when the vessels that feed the kidney become narrow or blocked due to a build up of what they arterial plaque so it is a bit like when you say furring of the arteries this is the fur and I can show you where it is and give you some idea of what we are talking about here, so if you look on the right side there is a tube coming off on the right there is a little pinch like a little divot and that is the stenosis that is the blockage into that kidney so often that can result in a surgical intervention to try and unblock that a bit like plumbing, on the left hand side, this is a 3D reconstruction that has been done of only one of those kidneys, the kidney on the left the healthy kidney on our left anyway and it has been digitally relit again and a degree of transparency has been added to the shading to allow some insight into the internal structures and it has been orientated in a completely different orientation compared to the scan and it has been isolated from the rest of the anatomy and I would maybe ask you Donna first of all what insight you feel these images offer into the human body and how you would describe the visual qualities?*

DC *I think the actually the specific context of the body is even in view of the MRI I think the problem of seeing something that moves in a depth manner from high to low is really misleading to someone who is not trained at reading it and if the furring of that kind of artery was that small divot I mean that is very kind of a hard thing to catch unless you were pointed out and even when it is pointed out you still can't make the connection between that and looking at this repercussion but the one thing I think culturally because we are aware of the kind of internal lay out of the lungs, windpipe, tummy, intestines and the kind of shapes they do again it is again like the first one I kind of feel I suppose kind of comforted that I see the kidneys the two of them in relation to a very kind of vague sense of the body map whereas when it is isolated I would probably really briefed about oh this is a kidney, our kidneys are down here and the shape it like that and I am really randomly, it was the first thing that occurred to me seeing it as it is quite brain shaped and I almost kind of read or misread even though I know a brain looks different but it is kind of perhaps not recognisable as a kidney but I'm not sure it depends on how it was supported and how it was framed whether that would be a problem again depending on the ultimate kind of context and the goal, as an image I think again it is quite interesting, I mean it is layered and that is one thing you would want to look at it and kind of explore the kind of arteries and then the interior and then the sac and then the kind of webbing so it again fascinating and slightly flower like, I think it is quite an organic looking object.*

J *Do you think as the image moves again similar to the last image that you saw the sort of depth of fielding measures the vertebral arteries is really*

highlighted do you think as the images move from the origins of again the scientific starting point is almost like moving through the spectrum where the goal is to impart information but as we move into a degree of abstraction and almost like the volume is turned up on the aesthetic or the visual aesthetic that it broadens the context of the work, it moves it, it sits quite comfortable in this almost like of art gallery space or does

DC Yeh or does it sorry John

J No I mean it is an open ended question

DC Yes I think as a kind of broader theme the kind of notion of the invisible or the inside and people's interest in that or known interest and how we objectify ourselves, our lives and go on and kind of any object that is kind of treated in that way I think would sit in its own right and probably have a very different context when it placed in an art environment but there would be no issue of where it were seen, ethically the actual data you used or whether there would be any disclaimer required if you were looking at a disease to do with ethics about we still own the insides of our body it is still ours so it is a bit like a portrait and that might throw up an interesting question.

J I'm going to put up another image which may be builds on this theme and it is the same piece of data and it has been visualised in a different way the orientation I have adopted has been very different and I have applied a very different technique to build and construct although it is again from this kidney and previous kidney work and it is all the same thing and it has been lit in a very different way with a degree of global illumination to it and again I'm going to ask you some of the visual qualities that are coming to mind when viewing this Donna and what integrity you feel this imagery has?

DC It is now very sculptural it is now kind of very kind of physical I suppose or kind of an artefact which given your previous question is now kind of almost firmly, it could almost firmly be a piece of kind of art work that you would expect to see either kind of modelled on a plinth or kind of an interpretation of skeletal remains of the Nevada Dessert I mean it has just got a very different to someone who has got an aesthetic that is very different and if I was trying to access it in terms of looking at kidneys I think all it offers and I think it is much less successful if the shape of the kidney and again because it is isolated and perhaps it is quite unreal, it seems much more

J Do you things images can function in both domains and probably not but I don't know what your thoughts are Donna in terms of as we move it away it becomes much more interpretive almost to a high degree in a sense ambiguity, ethically there is very little value in showing this to a patient in a sense of trying to explain the disease process but do you think there is images that can be, there is obviously firmly now moved itself away or I have intentionally moved it away to something else, do you think there is images that function in both or could function in both, probably not and serve both masters

DC I think probably not I think until I suppose our kind of culture perhaps it there is proliferation of three dimensional simulations or visualisations at mass level people are much more aware of ones that are more akin to that actuality then perhaps the more interpreted ones have an interesting role because the interpretation is different and asks them to think about things in a way the common becomes common whereas at present I think we do kind of speak with much different voices we seem to have much different purposes and I'm not sure the two would ever been resolved, em if it is talking about a much more abstract level about the notion of the shapes inside or the beauty of an internal or the kind of wonder of the kind of spaces involved in their insides so having a minimal interpretation does that but as you said it is much less about getting someone to comprehend the notion of health and disease and take responsibility for their body and how they treat things.

J It is having this ability to look as well because I have found it really fascinating so far that the insight that I'm starting to gain, I mean as I sort of suspected that the medical practitioners who are versed in images they work and live and trade in images the clinicians I work with their language in their whole profession in radiology is built round pictures but when it comes to try to navigate through a picture like that they find it very difficult, they see no value to it, it is a bit like an engineer would come and approach a piece of aesthetic form they can't, well one thing they have very little to vocabulate to try and describe what they are looking at and secondly a lot of them, depending on their background and I wouldn't say this was true of all but they find it very difficult to see the point of aesthetic because they are not looking in the way that we look at form and structure and harmonies they are looking, when they look at form, structure and harmony they are looking for obviously to make a diagnosis but they are looking for signs so when you have got ambiguity you have no signs almost the signs are kind of hidden they are there for you to sort of dig out so there is this whole notion of working

DC But I kind of see the level of, I mean MRI whether that is ever going to be redundant technology it is obviously not an ideal one it requires training and understanding to read disease that is quite tricky, it must be to start with and you learn by practice and by example

J An apprenticeship

DC And it is not 100% the rates of conclusion must be quite low

J It is interesting

DC Or whether they can do high res or they can do more specific things, so with that I wonder the kind of people who deal in images it is their currency it is what they are expert in a way they can be quite protective of it and at some point you would think an evolution of technology the MRI becomes replaced by something and that whole learning curve would have to move but do they need to deal in aesthetics do they need to deal with emotion do they need to deal with other parties that need to understand it in a different way

J Well they do in the sense that they now have this issue where they must be able to communicate these complex issues because patients need to know and there are legalities and ethics of consent but how can you present

patients with a variety of options and therapies or surgery they don't really know what is going on and equally getting people to buy into improving their and changing their behaviour if they are involved in behaviour that could be detrimental to their body so it is getting them to understand the structure and that is where this project started that was, I don't like this word but that hypothesis was what initiated the collaboration but what is interesting about MRI image is that there is a perception that has got a higher degree of truth to it because it scientific reproducible but in actual fact there is a large degree of interpretation in that image as their would be in photography, how do you change the aperture and how you set the film speed in old cameras it is like in an old SLR will deliver and image of a certain style and a certain look and MRI is not any difference it is just the knobs are slightly different and so depending on the skill of the radiographer they will produce very different types of image but they have a degree of reproducibility and large scale trials to pin down how they might image specific diseases so they can eradicate the margin of error, eradicate ambiguity and try to build a degree of this reproducible model which seems to be what science always wants it has to be able to, you take an image of one patient and take an image of another patient you would expect to get the same

DC *Again the problem is in the hand over of, to reproduce, to use images to communicate to the client there is a real kind of cliff edge happens when you have to then move out to people who culturally we do not perceive things in a depth of metaphor a depth from high to low or from front to back really I think it is a bit different and I think that is kind of wrong obviously,*

J *I'm going to move on, that is really good Donna and we are going to move onto some other images and we are going to move on to anuerism and I will explain what that is, it is interesting though just as a side note that as a 3D artist, artist where they are more kind of contemporary or traditional media or whatever I have had to become equipped without vocabulary, some of this discourse I have had to learn a bit like learning a new language to build these images I've had to sort of immerse myself and do this residency and start to become almost like able to converse in the language so that I can function in this new country that I am now existing in and listen and understand what is being talked about and be able to buy bread and so forth as you would in a foreign country, it is not that dissimilar and now I feel quite confident looking at images I can pick out anatomy now from these sort of things and I can reconstruct it and it is helping feed this stuff as well, almost like the craft based process of physically building the work there is another sort of craft which is being able to absorb and translate some of the invisible aspects of the, but I'll just explain what is in these two images Donna this image here is a CT scan so this is slightly different from an MRI in a sense that It uses x-rays and it is again a plastic tube that you are put on a table but the tube is more like a doughnut and it is something they do, it is a lot faster process you can come in and out of a CT in minutes rather than half and hour, 45 minutes in MRI and this particular image is of the abdominal area where again it is a cross sectional slices taken in one moment in time and it is a diagnostic set of images that were done to detect a condition called abdominal aortic anuerism which is basically just a bulging at the bottom of your aorta, the aorta is the large blood vessel a bit like the ?? that leaves your heart and supplies blood downwards through you abdomen as it splits at your groin and that is where the anuerism is and it is a pretty life threatening condition if there is nothing done about it in terms of surgery and it is the result of heart disease or kind of vascular disease of the arteries, arterial disease but on the left here this is a*

reconstruction of this and it is the most basic form of reconstruction that I work in, in a sense that there has been very little in colour and there is basic lighting being added but very little interpretation, there is very little of the finesse of the previous images, it is as close as I can get to the original scan data in the sense there has not been any smoothing or any change and it is still in the software it has not been even rendered and it is an orthographic projection so there is no perspective to it, it is just straight ahead although there is some basic shading to give something of an interpretation, so maybe I could ask you just to comment a little bit on the qualities of these images, visual qualities and what insight you feel they offer

DC *The one on the right is very intriguing I think as an artist it is very seductive because I think it is very abstract with lots of variants in lights and darks but in terms of familiarity now from the handle you can get a location and what is happening is the kind of spinal column you can see the shape of the spine and that perhaps comes from perhaps the formal training as an artist where you have had a skeleton and you have seen a spinal column so I'm not sure that general society would even know that shape*

J *Sure Joe Public*

DC *Joe Public so in a way I think this has kind of taken that step of communicating to non experts on some levels, on a another level of being unsuccessful, very hard to see the kind of anuerism whereas you can orthopaedic straight view indicates that but again you would have to be briefed that that bulge is not normal and perhaps involving some perspective or a side view which would show the volume of an anuerism or a comparison between the standard flow and the anuerism so that you actually perhaps see the anuerism below and that might fully communicate the problem of it. I think the role of the skeleton is perhaps too prominent I think because it is so shaded and textured like the anuerism but is it, cohesively believe in terms of the body you can see the locality but you are kind of interested in that as well as looking at so perhaps if that was made more secondary and this become more involved I think to get a sense of growth or volume but it is much more successful in speaking about the job I think, the problem.*

J *There is a couple of other images that are of the same but they are from a different viewpoint, what is interesting about this image is that in some ways the red part, the aorta the bulge which is the anuerism but that is actually like a relief impression of it that is a cast of the blood flow so the actual anuerism is bigger than that, and it is interesting as well you can see on this one as you go down the tubes you see these kind of little flares on the tube, if you watch the spine and watch the tube when it gets bigger you see these little flares on the inside well that is the furring, that is what they call the calcification which is why you get this horrible texture because you use these sorts of images and you get almost like the surgeon or anatomists that I've had in so far to describe this, they have a kind of graphical language like one described it and often when they go in to sort this problem they will put scaffolding up like metal to keep the walls in because they are very thin now and they could burst and if this bursts it is really dangerous and they have to go in and they are saying often when you pull that in you hear the cracking because the calcification is a bit like having calcium deposits, it is not calcium it is various other compounds don't know what they are*

DC *Just layers*

J *Layers and just hearing them describe that noise, building that picture*

DC *Which is how they visualise it and how they operate and I mean that is quite revealing that shows they enhance what they have in their heads and fully understand the fragility of what they are dealing with and the danger or as if they kind of probably just dealt with the hard facts you wouldn't get the whole picture either perhaps so that is quite revealing but to involve audio to involve metaphors of scaffolding and having to build a case round to support is*

J *Well metaphors are used a lot they use plumbing a lot, I mean you hear that a lot from them and especially, I mean you won't hear it from the science side of things but you hear it from the clinicians who work with patients and the doctors as the coal face because they have to change their vocabulary they have to change the way, they have to dumb down medical speak so it makes it penetrable for people to understand and they do use this analogy of cleaning the pipes out and going in and they have like, sometimes they go in and inflate balloons and the balloons will pull the walls apart and they will go in and they have got a sort of like various kit that will clean, brushes or wires in these to clean out these arteries, so there is a degree of narrative and story telling to this constantly and even when they talking to each other I think, they have these meetings call multidisciplinary meetings they are called and they call one of them to talk about this patient so they may have a radiologist who is a doctor or consultant who has asked for this scan to be done but there may be a vascular surgeon come along to one of these meetings and there may be a few other people there may be some medical students and they will all sit round and they will put these on a screen and they will discuss what they think the best method of treatment but often they are talking across disciplines in medicine they had to dumb the language down and change because surgeons are like sculpters they don't talk the language of medical imaging they don't understand that sometimes what you see isn't necessary what is there and that is another interesting point that this image doesn't have an absolute truth to it, it is actually just the machines interpretation of what is there based on the parameters that we put in so sometimes you get artefacts they call them which are basically anomalies that come up on the scan which look to all intense purposes like there is something there but in actual fact there is nothing there it is just a phantom on the image or alternatively there is not enough of a particular compound in a tissue for it to show, so even though the kidneys might look a certain size on the scan they are actually a lot bigger because it is only recording where blood got to so there is all this notion that well okay that is it, but it isn't actually it*

DC *It has to be framed within its parameters to recall what it is looking at and the unknown is always a factor. I mean I suppose the thing that is kind of, as it is in the background the one on the right is, it does seem quite challenging it does look quite negative that looks like a proper whereas your previous ones aren't*

J *There is a degree of rawness to it isn't there, there is a degree of, there is a lack of humanity a little bit, it is a bit*

DC *Yeh with it looking like purplish blood the kind of thickness of it.*

J *It is almost like the artist has got, working in this domain is the responsibility not to always present something with blood and guts and gore, certainly in*

the computer graphics it could achieve that if you really wanted to but it is to achieve a kind of humanity that doesn't involve reality which is sort of, I mean what to people who work in traditional medias do and of course they are not interested in replicating reality a camera can do that but, well depending on who they are but there is a tendency particularly in contemporary media like 3D computer graphics to replicate a reality but in this case that would be completely inappropriate, I think even in a sense when you move it to an art gallery context you go back to that kidney that was quite sculptural to replicate reality in that sense I don't know if that would serve any purpose you could tell any story, I don't know that is a slightly larger question.

DC *The same purpose could be served if you have an actual kidney and you kind of preserve it and have it there in reality.*

J *To bring it back on track I'm going to show you the last sequence which is of blood flow and this differs from all the rest of it because there is a degree of movement which I think is critical in a lot of this work and a lot of visualisation of disease and anatomy and lacks movement and soul to it and I think that is quite vital because the body not a static piece of tissue, it moves, it squelches, it pumps and just to describe what you are looking at here, straight ahead of you is an MRI but this across time so this is almost like a cross sectional one slice but over time through the heart and you can see into the chambers of the heart as the blood moves and it is pumped back out again and the only thing to be aware of this one is actually that it is not actually it looks like real time but actually it was acquired across several heart beats because the machine isn't fast enough what it does, it is quite clever it almost takes time lapsed images so it will take one image at the first stage of the heart cycle and then the hear will will move and it can't keep up so it will wait for the next pump and take another image and then piece then all together you get what looks like a real time heart pumping but it is acquired over a longer period and the image on the left here is different in many ways to a lot of the other stuff because for obvious reasons it has got movement but what it also has, it is a hybrid of lots of pieces of information it can't be really pinned down to the one piece of scientific data or one piece of visualisation it is definitely lost things, I mean the tube that you are looking at here is the aorta and that was taken from the image with the pinch in it but then the movement of the blood isn't taken from anywhere that is just me and I've added that I have eyeballed that from using this and I've translated this in my own head to something like this so it has not been in a sense been a transaction of material there has been an observation being done and a translation being done and the same goes for the red blood cells, you know obviously speaking to the clinician to get a feel of how may red blood cells move through this artery but to show that in the ways I wanted to show it there would be no point in showing all the red blood cells because it would just look like a liquid so I have obviously pared it back to a much more simplistic and obviously the red blood cells are high stylised as well they are not that size and they don't all look like that they are not shiny like smarties but to try and enhance this story of how blood moves and this is taken from a longer sequence with a voice over to describe what it happening so it is a bit in isolation so maybe Donna just describe in your own words the visual quality of these images and what integrities you feel they have and what insight they offer*

DC *The one on the left you kind of interpretation is actually more, I think it is more convincing if you are looking the narrative of movement of blood flow, I think*

the red circulars I think in our cultural landscape we have seen cells we have seen them stylised there is an acceptance already that is, it has not become an icon or symbol of blood flow yet but it is kind of there with various things that have happened on TV so I think that is not questioned when I see that and I then can afford to look at how it may move through that space and how it kind of flows or bounces and the actual pumping seems more important because I don't need to concern myself about what that red blood cells is and I think it is quite beguiling, I think it is attractive, I think the kind of varied perspective again just keeps your interest I think it is quite hypnotic I think the move is quite hypnotic which could be build into meaning something, it is a kind of life pump we need that, it is quite calming and I think this semi visible or opaqueness of the artery works well because it gives a sense of form it doesn't interfere with the flow whereas on the right I think that shows a heart pumping it doesn't show flow terribly well to a non expert, yes you can see the veins kind of illuminate or kind of breath or seem to come to life but it doesn't seem detailed and it is very much a look whereas your one is a journey it has a sequence where this is just a kind of metal level the loop once you have seen it you can switch off the journey and kind of question the start and end I suppose.

J *And do you think in terms of their integrities that this is moving into a n authenticity that is kind of narrative based and tell the story quite well but this still has a integrity it has a scientific integrity but it could be quite limited*

DC *The insight of the expert that it is actually a time lapse there is a question of kind of formal integrity because there is a kind of technicality that it needs to get over so that is interpreting already and I think this one is much more motive and much more kind of personal and I think people and non experts can engaged with it, I think the kind of more, it looks like solar flares in the background and it free falling it seems unhinged I don't really see much in that apart from the form of multiple cells in space it doesn't sort of really apply but when you are cutting to flowing through the arteries and things it is fine it is good*

J *I am going to just put up a couple of images at the end here and they we will go and grab a seat and a coffee. It is interesting and I'm not saying you listen to medics when they talk about that, they love that heart pumping image and for obvious reasons because they get a profound insight but just listening to them narrating what is there and describing what is there and using analogies like describing how the pumps open and close and how it regulates itself and it has basically cellular parachutes that stop it from like doubling backwards and listening to the poetics of the language and then I'm thinking shit how could I describe that in my way and it is almost like the humanity is there it is just they see that image they translate it they make and they give it all the extras because I wouldn't be able to build that without eyeballing that image and getting all the insight from the medics and it is a kind of really interesting process of translation, I'm aware that is the ?? of the artist I don't know that is another questions but we will go onto that in a second. So I want to put up these two images because they are polar opposites and this image straight ahead is the aorta, it is a cross sectional slice and this image is a still taken from that moving sequence and I just wanted to ask you to comment on some of the visual qualities on this Donna and what insight and integrity it might have if any?*

DC *They seem much more on the same level in terms of abstraction and simplicity, they have and having pre-briefed two very different goals of what they are the origins but switching off from that the aorta looks so abstract and uncontextualised it looks open it suggest a natural from, it suggest a river, is suggests blood flow, it suggest kind of organic, it could be man made it could be a satellite picture it is kind of abstract to a level of that whereas yours the one on the left has more hinges to it you can see it, cell like but does it really communicate that much to see apart from a sense of space the pinkish suggests a body but I've got this lighting and kind of seeing that in an abstract sense again I'm not seeing it as a light that might shine internally because my persona perspective of inside is it must be dark there is no light inside us, you have a lot to respond to in these images*

J *I'm going to put up this last image and then we will get a seat and again it is the aorta and it has been lit in a different way and it is from the outside and this here there is a narrowing that is the pinch that was taken from that original scan obviously from a very different perspective and there have been red blood cells added to sort of give an insight into the vessel so what are your thoughts on this one Donna with its visual integrities and so forth*

DC *It seems much more aesthetic, it seems much more artistic and I think it is the yellow illuminance on the side it seems much more about space whether it is in the vernacular or vision of outer space or something but the perspective the kind of side on with the pinch and the way the blood flow on the outside and inside it seems to communicate quite well I think you can see the tracking and perhaps doesn't suggest that being an issue it doesn't really seem that is a destructive thing that just seems that is in a way it is not loaded it had got quite a straight and it is not saying this is a negative or a positive it is just an image of the form so again it depends on the goals and it depends on that context you are requested to get from it*

J *Good shall we go and get a seat, thank you Donna that has been really interesting so in this last sort of ten minutes or so I just wanted to ask you some questions, what I want to do before just launch into these last two/three questions I wanted to just talk about what is on the table here although in some ways it is something probably you are well aware of as a practising artist but I find it quite useful to give some context and background on how the development of the work has evolved and the processes that go in to building these images because I think that is linked to integrity if you then move the image from this sort of scientific domain and just purely communication and move it into a sort of bigger context of just understanding these beautiful structures and moving it possibly into a gallery space I think it is important to some of these issues there is a degree of transparency to the way and development of the work, it is funny though as this experiment goes on I think transparency is actually really important to the patients as well to know where the information has come from, what it is about and how much interpretation has gone on to achieve it but lets just move over here for a second and we will talk through a couple of issues and it will move nicely into the questions I want to ask you but basically whenever I get this data is it not just a push button process, as you are probably aware that I read the interpretation and there are stories to be told and obviously a lot of it starts off with the anatomy side of things so there is a degree of analysing the anatomy you are dealing with but what is interesting about this is when I'm using this as a kind of context to building the work this is just one persons interpretation so this is already interpreted*

DC That is very much an illustration

J Absolutely and each one of these anatomist have their own interpretation of the human body and some are better in other areas and some are particularly good

DC Do you think because of the streamline or the actuality if you ?? it is a complex to visualise do they need to kind of prioritise?

J Possibly but a lot of it is to do with the ideal heart that nobody's heart actually looks like that I mean obviously it doesn't look like it has been used or there has been a media it is not a photograph but is some ways there is a high degree of stylisation even though it looks like there is a high degree of reality to that, everybody's heart is different and there is as much internal variation as there is external it is just that we are not tuned to see it and so the more you speak to the medics the more you realise this is just not the same it is done through observation on several cadavers speaking to health professionals and gaining a sort of mean but that is only his interpretation of a specific part and I'm not really sure whether, it probably is down to streamline and focus on a specific areas although what you find is a lot of these groups do cover the whole, all the systems they all cover the digestive system and vascular system and they are all pretty comprehensive to gain, but moving on from that there is also a degree of, there is a historical precedent in medical visualisation and the like and whatever you want to call it, illustration, it is not, what I'm doing is working with contemporary medias and this whole notion of building visualisation of the body and adding a degree of not ambiguity but I mean for instance this is Andrews Forsallis who was one of the first kind of recognised anatomist and published in the development of the printing press and he has got a grotto in the back of that and it has got this kind of bizarre pose to this kind of particular model which does that really add in our kind of reductionist society that would be seen as far too decorative and not really telling you anything but in its times that was state of the art and it is almost like we have kind of lost a little bit of that decorative notion

DC Yeh I mean and probably at the time it was without the grotto I think people would be disturbed I mean you need a bit of familiarity and you almost need it that the figure to be alive poses question in you

J It is bringing humanity it is brining soul to it almost and I think we have gone down in a lot of the work in terms of the way this is a visualisation of the body we have kind of pared away everything to the degree so there is no ambiguity, I mean medicine is by its very nature doesn't want the least amount of interpretation possible to eradicate error so they have thought police when it comes to particularly medical imaging and cellular imaging is one example that will kind of vet imagery based on where it has come from, how it was produced, the machine it was done with and what processing was done to authenticate it and almost like added some of these, this notion of decoration I mean this is another example where the anatomy, Rembrant is quite famous and it is more than the summary of the parts it is telling you more of a story than it is the fact this is a public dissection as a kind of series, so based on this kind of issue of using vocabulary of our time and using and I think you picked up on a couple of things Donna which was good which was like obviously there is a degree of kind of space influence to what I do although I'm trying to get away from them as I think it is bit cliched to be

honest but obviously there is a natural world as a vocabulary of describing these kind of natural structures that exists in public domain and there is lots of books published like that that adopt that kind of communication but I think my worry was definitely, and I think it is a lot like boyszone and this whole kind of, a lot of people that work with 3D computer graphics tend to be males in their mid twenties and tend to be obsessed about bladerunner and Aliens and the images tend to reflect that, you know what I mean and so it is trying to move away from that and trying to sort of move the work into a slightly more sophisticated domain, well I don't know about sophisticated but different anyway, I mean this is particularly when it comes to digital lighting this is the kind of area that I'm particularly interested in which is using kind of Caravaggio and Vermeer as a vehicle to understand really kind of complex manipulation of light through media, I mean this traditional media but the sophistication, beauty is incredible I mean considering the limitations of the media he was working at the time and I'm trying to build some of that sophistication in that kind of sensitivity into the digital domain that I'm working in to tell a different story and you have seen the final image and trying to work up the images to maybe tap into some of that and I'm not copying but just to give this notion of an analogue soul even just building the feel of grain into an image rather than this pin sharp

DC Unreality

J Yeh you are almost like undoing reality by making super reality I mean this is a perfect example this is my work and an ?? artist and in like a web discussion board and he has put, he has developed he has used his skill to make this ultra realistic heart but what service does that provide if you know what I mean

DC But that is not a real heart

J No, none of that is real that is all computer graphics that is all 3D so that is model and then he has painted that and he has put texture and he has created this incredibly crafted image but his sole goal was to make the photo realistic but in doing so he has totally dehumanised it, it has totally lost its soul it is just like something from the abattoir and so there is this and again it is something that again artists that work in can in traditional media are well aware of this they have been aware of this since the Impressionists and this is not a new notion but I think with contemporary media there is a struggle in ?? but the media I work in so that ?? but in terms of 3D visualisation computer graphics

DC It is a question of just because you can't should you?

J Exactly and I think it would be a good research project and I think a lot of it boils down to a lot of the people that work in that domain there is a lot of young guys working in the domain that have come from a Nintendo generation that were obsessed with thinks kind of, the ghost recon generations this sort of obsession with first person shooters and ultra realism it seems to have cascaded its way into these guys who are now in position of producing CG work, but I want to show you a couple of more things and then I'll ask you these questions, but I'm just trying to set the scene for these questions to give you an insight but this is again this is an a image that I have been working on recently and these are again taken from this heart, observing this motion and this feeling but rather than working from any sort of

scientific start point actually build a 3D heart from scratch just sculpt it out of a piece of digital clay and build it all up ass a little nuances in structure and again the movement but it is not born from any piece of scientific information it is just my kind of observations and then added colour, I've painted it up and added the movement but it still needs a bit of development but does because it is a purely interpreted piece in a sense that it is not born from any scientific start point apart from observation does it loose its integrity for a patient foes it actually matter if it tells a story it is probably

DC Yeh, it is tells what the goals of that story is

J That is its goal and context isn't it

DC If you require someone to understand the heart I mean simply the heart and not complexities of the heart and not a particular aspect of a chamber and I'm sure there is a case where people do need to just kind of have a handle on the heart in its entirety in a simper way perhaps pre-education we are talking about the heart as an object it has got X amount of heartbeats per life and you have got to look after it so yes it very much depends on the context and the goals.

J So I think we probably agree that it is the integrity of the authenticity has, it is about context it is about the goal you are trying to achieve and where you place that artefact ?? through its integrity. These couple of images here this is a loop of influences produced in the work and there is a lot of tooing and frowing goes on between the medical staff this is kind of almost perhaps a research one of heart attack and it is constantly reviewed because the work you talk to the clinicians and you go away back and there is an ongoing way off developing something that is maybe real and something that informs the goal that perseverance of artistic integrity and not telling a non story that maybe doesn't show fragility and not to just to completely be obsessed with this totalitarian approach to pure impart with information and even just building, not this image here, this is a image that I took of a mammoth in the Natural History Museum, it is not a great photo but it really kind of, if I had seen this image I would have seen this structure before this kind of symmetry and it helped to inform this piece of work, it almost like teasing out the hard wired aspects of the brain which is to pick out symmetry and the form and grafting it on to these structures as I kind of go through medical data and find really pretty structure, they are not symmetrical but they are nearly symmetrical which makes them look like that, a bit like one side of your face it kind of looks symmetrical but it is not, but I've talked enough Donna so I'm going to ask you some questions about that last image and all that information and then we will call it a day, so the first question I have got is what would you define as visual integrity in your own practice before you produce work and it may relate to what you said before which was context and

DC If there is, I suppose if as an artist there is a proper and it is normally self guided but if there is reflection there is questioning, there is review there is an awareness of why you are doing it and I think if you can handle it and keep that within the kind of horizon when you are producing work because part of the virtue of making work is it is enjoyable, I mean art it is the same way other people may love an aspect of their career I think the actual producing the work is seductive to artists it feel good I mean there is a personal investment in it and a pride I think when you have included it so I think the integrity is

managing that and you don't become over indulgent with your own pleasure of making and you keep a handle on the kind of purpose at all times.

J *That is interesting because someone else mentioned that this process of kind of self indulgent, being self indulgent you can just build an image or a piece for your own sake and no other reason and you become totally consumed by it, it is this self indulgent wallowing effect and there is not conscience or*

DC *Was that another*

J *It was a sculptor and maybe that is an issue that happens a lot in fine art particular, I mean he did say that you do get pieces, you do get artists that have that kind of stereotype. It is interesting though this notion that there is these stereotypes of what artists should be and what they should do and who they should be and what they should look like*

DC *And I think actually tied up to doing a PhD I mean I'm sure a lot of misunderstanding comes in the amount of rigour it goes through the amount in preparation or the amount of analysis that goes in before you even get to kind of testing or making or experimenting and I think there is a rigour there that is a akin to any discipline in clinicians and in sort artists and again it depends on the practice.*

J *I mean rigour is like you say part of professionalism whether you are an artist or a medic or whatever profession you might be operating, professionalism is inheriting a link to rigour and then that probably falls by having an integrity in what you do and not working completely in isolation, realising that you are part of possibly a community, possibly a larger bigger system and inputting into that system and not, I mean it is often a struggle with the work that I produce, I swing between, I swing like a pendulum depending on what is happening round about me but there is this kind of social conscience, I would love to really help people and make a difference to people lives actually using my talent to make images more understandable and to help someone who comes in not feeling that great not understanding about what was happening in their body feeling like they are a passenger, and almost being an advocate for them and helping them through just pictures and my ability to tell stories in a sense of using the media that I work in, to help them understand but another part of me there is a struggle where another part of me thinks well okay that is one aspect but working in academia being in this academic context and thinking more about what I want to do and what I want explore I kind of become a slightly more selfish and think well that is only one aspect to what I do maybe there is another side which I want to exhibit and show work and produce pieces that maybe don't just convey this notion of how blood flow moves through the body that there can be an abstract issue of fragility and I work with a sculptor and produce a piece*

DC *So it has a much more open context*

J *Absolutely and it is this struggle that I've always has because I come from a design background, I did industrial design, I am a designer I always feel more comfortable working with a brief and producing something that has value and in a more direct sense, but as I have evolved and produced work I feel that you can't just do that you must do other things or you just become, I don't know what you become*

DC *If you made a body of work for exhibition and removed some of the rules I would think there is a good chance of what you produced informs the more brief led stuff in the same way you are always looking for ways to think about the poetics or the approaches of how you can handle the information and some of that will come through open ended play or not sheer indulgence but a look at pure form and how inspired you are or how intrigued you are at something, or something that is unexpected I mean a lot of our serves and functions simply at that level, it is an important one to show things in a different, show things that are other, show things that confound what people expect and normally it is done by being attractive or very confrontational, I mean there is different strategies but I'm sure if you made a body of work the problem would come is if you expected that to I guess change broader societies understanding of what you are doing and I think then the integrity becomes slightly more suspect whereas if the agenda and why you are doing it is quite honest then I think the integrity holds, I'm sure it would inform it*

J *I mean I suppose that is the good thing about doing a PhD you have time to think about all these issues you have time to analyse and contextualise your process and the artefacts that you are producing and see what relevance they have in different areas, I mean I think you are right in what you say that you could be seen to inform the brief based sort of process and maybe sometimes that can be seen as the original contribution to knowledge as well that you could develop a different way of thinking.*

DC *Her name is escaping me, the female artist that kind of pioneered caves who did the big osmosis as one of their projects it was a substantial project, it was a landscape, it was a 3D, it involved immersing in a cave using the kind of virtuality*

J *I know what you mean yeh*

DC *Char Davis, now that was a purely artist exploration but the ripples in terms of visual language and aesthetic is far reaching, massively reaching multidisciplines so there it is almost the kind of role of it crossing disciplines especially in terms of visual language and offering people a different understanding of something*

J *That is interesting isn't it, I mean in some ways that is what has moved me into producing work that is a bit more ambiguous because I feel like I have got this looking glass now into this world that no one ever sees I mean medicine does, these machine, these MRI machines and CT machine they maybe in every hospital and there may thousands of scans every day but no one ever looks at what is in them, they look at them to find out a diagnosis and then they get filed, I mean my PhD has been pretty much based on four pieces of data, four pieces of data that could be done in a morning at Ninewells and I've spent almost three years of my life just going and revisiting those and reinterpreting those and finding beauty in them and it is almost like*

DC *Are you trying to decide whether you are going to work that has got a utility to it, it has a purpose or whether it is going to be more by exhibition?*

J *I don't know, I think, I don't know if it is even just a decision making, it is not in the sense a fork in the path, do I take one or the other it is almost like one has sort of evolved, I mean I've always done the brief based stuff, I've always just got on with it and that is always there and I'll always do that, it is almost like*

I'm not comparing myself to Michaelangelo here, so don't get me wrong but it is almost like you are the service of the church you are always going to do the odd, you are going to do the work for them and get on with it but there is also a strong argument and I get the most interest out of building work that is accepted by a peer group because the medics and the patients they love all of it whether it, they love the stuff that I do and it communicates and has a small degree of aesthetic to it and it is kind of quite pretty but it tells a story, they have never seen anything like it and they are really keen to, they have never worked with anyone like me before but I get the most kick out of building work that get a reaction from someone like you or somebody who sort of peer reviews the work and a lot of that happens through the work which is slightly more ambiguous and has a stronger degree of aesthetic quality to it and it is not like anybody else's work because obviously people have seen blood flow work before, they have seen blood pumping through, I you go to a Soho agency, an animation company and they will do you something like that in a couple of weeks, they will get a couple of animators working on it but producing work that maybe looks a bit more like the kidney that was sitting in situ or exploring a bit more, or experimenting more with the blood flow people maybe haven't seen that before

DC *Yeh and I think you are kind of, that your origins table if you are looking at references and prior knowledge that you use I think there is something very interesting in using old or heritage kind of media to site Vermeer's as a source of lighting it is something that it philosophically very interesting when you have notions of real and unreal and kind of texture and how we connect to things and tactility and how that can be learned from various sources and the nub of being creative is open to and almost needing to look at more eclectic references to stand out because as the norms develop you need the kind of challenge because when things become standard, I'm a great believer in I think society responds less it is natural*

J *We become quite numb don't we, we are quite saturated with computer graphic images now as well, contemporary media saturates a lot of the media that we look at like film, television, it is almost like we live in sort of neo baroque, it is like an electron based baroque it is not like the Palace at Versailles it is almost like a visual baroque but we don't appreciate any of it, the difference is that we don't go and we watch the matrix for instance or if we watch the Blue Plant, we don't go, we go Wow and then we go and have our tea, it doesn't resonate because there is no reflection and it can be quite frustrating because it could take three of four years to build these features or these films and they don't have*

DC *But I'm not sure whether they are build in ways like Blue Plant would be different but the Matrix doesn't really build in, its premise is very fictional and it is like how do you and part of my PhD was based on how do you foster the emotional response from people who are saturated and do not expect to want to think anything about the image, I mean how do you create that and there is devices, is it important that they get that*

J *I mean I find the biggest inspiration was looking backwards, I mean it sounds really and particularly working in a contemporary media I think it is very clumsy and 3D computer graphics I think is still very clumsy compared to like I you go back and look at Caravaggio and you look at the gravitas and the weight and the quality both on the craft side and the intellectual side and the contribution not to just original knowledge but spiritual knowledge whatever*

you want to, to provide insight and the fact that they artists would be killed if they didn't do what they were supposed to do but they still took these risks, you know if Damien Hurst, he might get some hate mail and he might get slagged off in the tabloids but he won't die but Caravaggio would be killed by the church for heresy if he didn't produce what they wanted although he still produced what he wanted and so there is all these kind of historical precedents for pushing the ?? I mean Vermeer wasn't going to be killed but he was still living in a politically unstable time and he still again this service of the church and patronage and this pressure to serve what the patient wanted and it is not dissimilar to be I have a kind of pressure from the science side of things they are the patrons in this work and often they pay for a lot of the equipment that I use but looking back at these sort of precedents maybe helps and form and brings some emotion to what I'm doing, that is where I find inspiration if that is answering you question and how do we bring emotion we maybe need to look back but whether Joe Public really kind of gets it I don't know, that is the problem as well your audience is very cynical already about contemporary art whether they would

DC *I think to strategically, it is a bit pure communication you want them to understand and I think as it stands I think there is a massive gulf between expert knowledge and genuine understanding of the kind of classic failure of bedside manner or failure to comprehend someone who is without a clue and who is generalised and it is a tough remit, you are asking someone to be trained in part in sociology and trained in contemporary culture about peoples, what they have been and to switch off your understanding of it and then communicate it is almost, you are perhaps looking at an intermediator who can do that who can handle what they need to say but also aware of the populous but you would probably almost need to kind of look at the very current media the icons and the graphics employed culturally that are common and comforting and use them and hijack them to get people to deal with it, it is one way*

J *That is interesting, it is funny that brings me on to my next question, fits really nicely actually and what role do you feel the artist should play then when working with medical scan data and probably continue onto that broader context of clinical work, what clinical imaging what role do you think and some of the words that have been used and these are not be people that have come in but I'm just throwing these into the mix like translator, mediator, illustrator and somebody said yesterday advocate, do you these describe or not describe the role of an artist working in this sort of*

DC *I think in this the reflective practitioner to me you are observing and reflecting and then by practice by making you are offering a contribution which I think does show the kind of, I mean a few of those terms are loaded and come with baggage and come with baggage from all sorts of unexpected places, I mean the advocate to me kind of suggested a bit more of a political kind of agenda where it is about the clients rights, honesty and truthfulness, I would think that would interfere with the artist process that is kind of camping really in the designer would be an advocate I suppose, the illustrator because I, by virtue of background have quite a respect for the role of the illustrator who I think has a place but I know comes with lots of baggage.*

J *it seems for some reason and I don't know why it is funny that from some camps in the fine arts seem to see that as some sort of play off that you become an illustrator you are not actually given any insight which I don't*

agree with but there is a, and to be honest most of the fine artists I have interviewed so far don't seem to fall into that bracket

DC *If you are seeking to communicate with some utility with some purpose that is normally more defined than the fine art agenda then you are illustrating so*

J *It is almost like this project kind of jumps between disciplines as well because in some way you could be seen as a designed because you have a brief to answer and you have gone in there with quite an open ended requirement to build some imagery to solve a problem basically and I've used my own practice which is to build images to solve that problem of communicate so you could see that as a designer, then in some ways you could be seen as an artist in this image because you are producing images that have visual and aesthetic values to them and they are more than the sum of all the parts but equally a designer produced a product or a piece that he would argue is more than the sum of it parts*

DC *I think the relationship with the data and the other level of expertise I think traditionally a designer is not an author there is not a lot of authorship in designing, you handle, you manage and you produce whereas if there is authorship, a heavy amount of reflection being creative then I think that is passing the designer role.*

J *Quite interesting isn't it, the last question I have then Donna is did these images affect the way you think about your body that you have seen today?*

DC *I'm not sure it did, but I'm not sue how I think about my body, I think if I had a reason to think about it, if I was confronted with a personal need to know about the inside I think everything would become much more loaded but because I feel of sound health and not really considering it and perhaps because I know I am kind of pre primed that I know this is part of your research and I'm looking at the visuals I am not particularly making it personal to me*

J *It is funny because it is just that kind of last few comments there, because you knew what you were looking at a lot of people have actually thought that these were real, obviously you have got an understanding of what computer graphics can do and what is computer generated and what is not and anything even close reality a lot of people see that as, that is it, that is an absolute truth which is quite interesting, which is bizarre and I think the same goes for the scans as well I think there is still a degree of weight placed on the scientific images and again this relates to integrity that they have, they are a reflection of what is there but they aint a reflection of what is there and in some ways just an interpretative although they have got this and I keep saying this this reproducible and reproducible model that gives them weight and they have to because they are there for diagnosis you couldn't constantly fluctuating and changing sets of images but I think from a philosophical point of view or a historical still I think these reactions are quite interesting because there was still this weight and I think it is to do with the last section and the development and how much weight people put on science to provide all the answers there is still this dependency on science and now we are getting tot he point that we are starting to realise quite rapidly that it can't provide all that answers that the human being is more that a sum of all its parts but there is still, I get the feeling anyway and this is just a gut feeling it is not really based on any specific evidence but it just seems to be this, still this perception that*

science offers more of a truth than the arts and that is all we need this utilitarian outlook it is maybe fostered by the press, maybe it is, but until you get ill you realise the limitations of science and medicine but until it happens to you you don't realise sometimes inadequate it is and how little it can provide

DC *Uncharted and how much unknown exists, how viral attacks it seems to be on the agenda from various people, like ?? illness of which the diagnosis is it is viral and it is so inconclusive, I don't know whether it is a generational thing the kind of blind trust*

J *I think it is I think maybe the post was era I think definitely my parents and definitely my grandparents that the GP was this sort of boy who went to the Grammar School he was top of the class he went off to Aberdeen to medical school or Edinburgh he came back he knew everything he had all the answers and when they went to hospital they had this, the guy in the white coat would save them and I don't know historically wherever it is born from I don't know but is it so destructive in some ways because it puts so much pressure equally on the doctors to come up with the answers and I don't think they have it all and in some way they are so strained as well and it is easy to criticise the medical professional but they are very intelligent people and they are people under it all and they are doing their best most of them anyway and they are trying to provide the answers they are using all the equipment and all the skill that they have and the experience that they have to provide the answers but it is this recognition that they might reach a ceiling of understanding and they probably reach it quite quickly and they have got fairly blunt instruments to deal with problems, they are certainly not pointed in any sense, any of them when you realise what they do and that goes for cancer, vascular disease, surgery it is all pretty blunt it is not when you watch these science fiction movies and there is this nano technology is going to save us all we are still cutting each other open we are still like feeling our way round this anatomy and pulling things out and sewing us back up although it might be a tube with a camera on the end of it and we are still pumping ourselves full of toxins to kill off cancer but we are killing off everyone else in the process, so we loose our hair, we are sick all the time so we are effectively poisoning ourselves, we are not doing it but he medical profession is, or we are pumping ourselves full of radiation and it might be focused on something the size of a plum but it hits the plum and it will go through the plum and out the other side, do you know what I mean, so it will take out everything on the way in and everything on the way out although I'm sure they will argue they have much more directed means of doing it so this notion that somehow science is much more precise and it is this movie vocabulary of the stainless steel environment and machines*

DC *It reflects the only other kind of blind faith which is faith when people believe in a*

J *Absolutely, absolutely that is good actually a good analogy*

DC *And a kind of common thing is an inability to discuss or debate it is a blind faith it is the, they need to think that medicine can solve until personally our loved one has something where they need to interface with the system and similarly both faiths struggle, people are tested and can you accept all of a sudden that the NHS here in the UK doesn't provide an immaculate service and do we expect to be fixed, it is not our fault we expect a system to pick it*

up and fix it so there is lots to be kind of shifted and paradigms in terms of people

J *And I think that is where this expectation and this perception of shifting ownership and responsibility to somebody else but in actual fact producing, I'm not saying my imagery would do that, but producing self reflection and self understanding and thinking I have to do something about this I can't expect medicine to pick up the pieces I have to take steps and this is a kind of grossly exaggerated but I've seen this image of my kidney it is so fragile, I need to look after myself these tortuous structures it could snap at any point and it is really quite fragile, I'm not robust I'm not as resilient as I thought and the NHS isn't going to provide, the doctors are not going to provide everything they might give me a tablet to get rid of the headache but they are not going to fix all my ails and it is almost like prevention and putting the ownership back on you to take steps, I suppose, although that is not why I create these images I'm just interested in this notion of fragility*

DC *It is very much, but what I found through my pregnancy in trying to deal with knowledge I wanted knowledge about what was going to happen, I asked to see instruments that would be used, I said, if it was all went down the tubes and we were looking at forceps delivery can I have a look at forceps can I have a look at the vent house.*

J *Is that the thing that they use, it is a sucker thing*

DA *yes because if they bring them out at eleventh hour if I'm not to freak out before I will freak out then I would rather know now while I'm sane and calm and not in pain what they look like so if they are familiar and the midwife who was part of the training said no because most people don't want to see them, they can't cope with it so we don't show you things like that and that mirrored a lot of the questions is people who would rather be ignorant and people who want to know and in that small, small, small kind of scenario most people didn't want to know, whether it is part of being an artist*

J *Ignorance is bliss*

DC *Who is of a curious mind who isn't particularly paranoid about her body I wanted to know and at the end of the day I ended up with a caesarean and four months later I needed to see a caesarean, what an operation is, because they protect you they put sheets up you can't see, you can feel and you can hear but you can't see so I had this overwhelming urge to know what a caesarean operation was like*

J *Did you have a caesarean?*

DC *Yeh so I kind of end of with a really kind of crappy quick time on the Internet looking at the incisions a caesarean happens which was slightly ooh but it helps*

J *It is fairly traumatic surgery though caesarean and it is fairly rapid as well because they don't mess about they just get in there and get the baby out, from what I gather from speaking to people are the hospital it is fairly rapid surgery and it is fairly traumatic because they have got to cut through tissue to get there*

DC *I mean I did very well, I mean the pain relief they managed the pain I had no discomfort afterwards but a year henceforth I still can feel internally where the stitching of the layers of muscle they cut through, there is a presence and I think that is all part of I wanted to see what they did and the complexities or the stitching, ultimate curious mind how do they tie off what knots do they use but I mean the general consensus is protection you are protected from having to deal with any of that because that might traumatise you*

J *It is funny a lot of this is one size fits all but there is a lot of research linking demographics and social economic groups and where they sit and how they react and I think a lot of the stereotypes do prevail and I think is reflected often in your notes, simple things like your notes that go along with you but wherever you go in hospital you have notes and that will build up over time, people like me for instance white middle class with the benefit of university education, very inquisitive will have a larger degree of notes because we will complain we will push the envelope we will ask to see things and we will want things to be done and sorted and if they are not done we will write letters and we will cause a fuss and we will ultimately receive a better services as a result because we will push for things and the opposite will happen for people with a lesser degree of education so they might not know what to ask for they might not often have the vocabulary to know what it is about but the biggest problem is that people who tend to come from lower social economic groups tend to get sick and they tend to be the ones with problems and they tend to go through pregnancy earlier often and so you start looking at it from a kind of holistic point of view as well you see the failing of the system and the fact that you weren't allowed to see that was obviously a decision that some clinician has made based on a mean based on a general assumption about the patient that he sees so the patient he predominantly probably sees, the mothers that he sees the average age is probably about 21 because you have got a large percentage of a large social economic group becoming pregnant in Dundee an probably middle class mothers tend to have kids later and have less kids so there will be less of them so the generate this mean with very little flexibility, I'm just purely hypothetical here but there is some research to prove this*

DC *But there is a huge on personalisation and writing a plan and the majority of it seem concluded from other people, it was lip service I very quickly got the ??? so there was a big push in taking ownership and having a dialogue and deciding for yourself what you want and how you think it should go and until you are at a medical situation where an expert has to override not even override has to strongly advise you to abandon you plan, your plan is yours very quickly get lost.*

J *That is interesting*

DC *I mean that is all important how you devise a context and what one you choose and what context you are interested in or what one you want to work in and it is going to make you feel inspired ultimately*

J *The artist has got to keep his or her enthusiasm*

DC *And wonderment I mean if you could capture how everybody eulogises about the images they see to suggest the heart has all these really beautiful little parachutes if you caught all those words and all the descriptions that is a really rich starting point for you to work, visuals again because people are*

already thinking in visuals they do not have the skills to put down but they are already making analogues.

J *This happened yesterday actually an immunologist came down and she was saying (interview ends)*

2.20. Fine Artist D

Interview with Fine Artist D
Date: 25/10/06
Time: 11.30
Duration: 1:27:17

J *So basically the way this is constructed is we have got two screens here and one I'm going to show you scientific data and one I'm going to show you 3D reconstructions that have been produced from that and I just want to take you through four specific areas that I have been working on which is artery, kidney, anuerism and blood flow and they are all related to the vascular system which is the system of arteries and the heart that move blood round the body and that is primarily where most of the work has been focused. I want to just start off and what I'm going to do is give you context to what you are looking and so we are not going to make you look blind at the images, I want to give you some context and then from that I will then give you some pause for reflection and then we will maybe fire into some of the questions. So I'm just going to put a sequence up here, so straight ahead of you this black and white image this is an MRI image or a set of MRI images, these are cross sectional slices and just to give you a bit of background MRI is a process of scanning that involves you being put on a table and moved into the core of a large plastic tube which is the magnet and that magnet allows the clinicians to sort of take these cross sectional slices through you to understand more about your anatomy and your physiology and in this particular image this is of the head and neck and the areas that are glowing white are the arteries that are feeding blood and oxygen to the brain, the image on the left on the other hand is slightly different in the sense that it is derived from this particular MRI image and it is a reconstruction so the shape and form is informed by the structure of that scan but other things have been added particularly texture and lighting and there is a variety of camera views that kind of blend into one another and it lasts about ten seconds and it just sort of pans through so I will maybe just let you watch these for a few seconds and then we can maybe just start the questions.*

FD *Would this image also be for a clinician as opposed to a patient or is this for the patient?*

J *Em primarily these images on the left are the visualisations and they are not for diagnosis, they would be for a much broader audience whether it be patients or whether it be something like this so they wouldn't make a diagnosis from this particular image on the left but they obviously would from that and the closest were are going to get to the raw data that has come from the scanner although there is a degree of interpretation in that in the sense that the machine will convert data through various mathematical algorithms into this image and in doing so it changes the integrity that is has got. MRI as well is not like taking a photograph, equally as well it is measuring densities of material or molecular proton densities so in some senses you may get a feeling of realism although this image is far from real. So maybe based on that maybe you can you describe to me what insight*

you feel these images offer into the human body and some of the visual qualities each one has? And feel free to make comparisons

FD *I don't know it is, I suppose this interest me that is converting like you say values in tones obviously you would need quite a degree of training to read it but you have got this immediate understanding of the structures probably even if you hadn't told me what it was I could have grasped it quite quickly, the fact that it is moving as well obviously they get those series of still shots don't they and they run them together*

J *Yeh so it is slices going backwards and forwards, it is one moment in time but it is like almost like going through slices of bread in a loaf.*

FD *I don't know if it is just a result of watching a lot of TV or watching a lot of film but I think when people have got that kind of slow panning movement probably rehearses what they would do if they had it in a 3D structure, if you had it to hold and you could hold it up and you would start to tilt it and move it just in that type of enquiry yourself, although you are focusing on the vascular system I suppose I'm finding it is immediately more abstract that this image over here which has that has that sort of figurative aspect but*

J *The 3D is more accurate than the 2D?*

FD *Yeh, although I would qualify that by saying the panning, I mean if I was just to see this image without anything else and without speaking to you it might take a while but I think as it tilts and you start to get the kind of relationship between a head and like further down and the depth and the width of the arteries I think you could work it out quite easily what it actually is. I don't know it is kind of, would these be, these would be moving right, pulsing all the time*

J *Yeh well I mean it is a good question I think there would be a degree of movement as the blood passed through them but I don't know how much movement.*

FD *Does anybody know that John?*

J *I think so, there is probably ways they can measure it, obviously if they took these scans and run them in time sets over time so they added, as these are kind of snap shots in time rather than like over a period of 10 seconds I'm sure they would be able to tell you actually what, I'm sure the clinicians would probably be able to tell you, I think they do move because obviously because they are pressurised the blood is forced through them so there would probably be this kind of jerking motion as the blood moves but it would also depend on the surrounding tissue because there would be tethered to things, there might be ligaments that go over them, there might be tissue packed round them and it may not be attached but it may cause less movement but obviously that has been removed. I mean it relates as well, this is the sort of next question, do you think that the image, the 3D images because it has a degree of abstraction and are an interpretation compared to the 2D one do you think it has less integrity or more integrity or a different type of integrity?*

FD *I would have to say it was different integrity as this would be effective in the way that they are presented here but in ??*

J So how would you describe their integrities independently

FD What do you mean by the word integrity?

J Basically well, in some ways it is a kind of broad term integrity and I related it to authenticity and it means different things to different people and obviously I think it is a lot to do with context, in some ways I'm probably answering the question I'm asking you here but this image in front is has got scientific authenticity or integrity in the sense that it is the truest or closest to some sort of scientific truth if you want to say that, it is an image that has got reproducibility and it has some sort of weight to it but in saying that it had a degree of interpretation, it isn't in any sense an absolute truth it is quite distant from that in some ways it is a visualisation using instrumentation but it carries weight and authenticity because it allows diagnosis, so it built into a reproducible model so it can be repeated again and again and again but it has a reproducible mode that I think is misleading in some ways that is has a reproducibility that is still subjective in some ways that it is a bit like photography, even though they are setting film speed, they are setting an aperture like a camera and maybe composing the subject matter in the same way every time that is in the shot they sometimes still come out with different images, things change and obviously they don't always get the same image twice but there is a degree of tolerance or the opportunity to make a mistake and not reflect what is there is minimum. On the other hand I would say my image has possibly a different type of integrity I don't know it is till tethered to the science but I've moved it away I've added the subjective, some degree of subjectivity to it I've added colour, texture, lighting and camera moves and I've deleted information that is not required to allow you to navigate through the form so I don't know the integrity, I would say it has an integrity because it is telling you a different story and a different context, so in some ways integrity to me meant, I think maybe a few years ago mean this but as I've become much more mature as a practising artist I realise that integrity is not exclusive to a scientific domain in terms of images that the images produced in an interpretive sense have just as much integrity but maybe it is different and I'm just trying to tease out what those differences are and how do we value these creatives

FD I think the fact it is on quite a dramatic cinematic scale here and as you say the context just conditions your viewer the minute they walk in. Would you consider presenting these images in the same way in a different context? I mean I assume that you don't have the facilities to show things on this scale in a medical context

J No, not really

FD I wonder what someone, okay I know you want to come away from diagnosis and the disease but how a patient to reacts to something on that sort of scale, because I'm quite familiar coming into the gallery, looking at this kind of thing and thinking all right fantastic, I'm also very familiar with thinking about what is that fine line between research and practice in a gallery context, but I mean they are going to hate it, these things do have quite a sci fi kind of nearly organic cybotic type akin to them but they are really interesting, I just kind of want to, I really want a 3D model of that, you will be coming back to something, they are so tactile

J They are kind of screaming with sculptural scale and from that you want to interact with them and feel them

FD Yeh you can really image just kind of coming up and squishing all these little sausages

J You could see a kind of giant one in the turbine hall when you go down a helter skelter like that guys, Karston and what is his name

FD I can't remember

J I'm going to show you some stills Sandra actually and we will continue on this line of questioning

FD Can I make one more point?

J Sure, no carry on

FD You know those kind of old style models of the capillary system that used to be made by I think it was by pouring resin down these are very different, initially they might have a slight resemblance to that just because of the form but I think because of the way you have handled it and the way you have modelled it, it has a very different sort of integrity and a kind of fleshy tactility I think more than when you see these kind of models presented in glass cases, it has taken away that kind of aged kind of look about it, it is more, not of now, but maybe a slightly more timeless image it doesn't have all this kind of, it is quite clear you interact with it quite quickly and it doesn't have any sort of visual baggage than it needs to have, so obviously half of this stuff is going to be disregarded and is disregarded by me even when I'm looking at it, I'm looking at like the outline and the major bits I'm trying to kind of move between those two things whereas with this I don't have the same impulse I don't have to keep saying where are the shoulders and where is the ears to kind of engage with this, I don't have to think about it.

J I'm going to show you another set of static images, they are from this sequence but there has been a degree of augmentation in some way, they may be enhanced or they may be diluted whatever, it will depends on where you come from, but they are a collection of images and what I'm going to do is I'm just going to play them through one by one and then I'm going to pause on one so I will play them through, I will just pause for a second and play one and pause and they I will stop on one and we will go through some of these questions again.

FD Cool

J So I want to pause on this one and again I will maybe ask your opinion on terms of what insight you feel this image offers and I will leave this one for context, the scan one and what visual qualities you feel this one has? Again feel free to make comparisons

FD Well clearly it is the difference between the way you deal with depth, this being a quite normal visual register this is extremely different, I mean I kind of think looking a print making, print makers are able to think in a sort of laminated slices whereas most people have to have it in that sort of, it is not perspective, what is the word

J *Orthographic projection*

FD *Yeh, that, exactly so it brings it straight into your own realm but again I think it brings in a weird sense of fantasy, images like this I always think*

J *The 2D one*

FD *yeh like the anatomy axe expression that just opened I can look at images like this in a quite detached way they don't actually make me think about my own body particularly, this is really making me wonder where this would occur and what things are missing and what things are inter-related and it gets across the idea of depth a lot more perhaps but I don't know the accuracy how accurate are these images?*

J *Well it is a good question in that I mean it depends how you describe accuracy, it is a kind of moving target I mean scientists would argue or clinicians would argue that this is the most accurate that can be achieved it is the closest to the raw scan it allow them to do a diagnosis, it has a degree of integrity*

FD *It is only one individual though isn't it, and would this be compiled from you working between different images?*

J *No this is all from this one image*

FD *Right okay*

J *So this is all reconstructed from this one scan*

FD *So again it just relates to the individual?*

J *Yeh it is the one individual*

FD *Because most medical representations in text books and stuff doesn't actually relate to anyone, it is a combination*

J *It doesn't really exist it is the gold standard of anatomy*

FD *An abstract idea just from the very start so this has got more authenticity if you wanted to look at it like that*

J *That is a good way I never thought about it like that, I mean that is an interesting way it has come out looking, talking about medical anatomists generally that there is a stylisation that happens and there is as much variation internally as there is externally in fact there is probably more because there is more complexity in internal body spaces, and it is funny one of the clinicians said that they spend their whole career trying to find out and work out a norm so they can work out what is abnormal, do you know what I mean*

FD *Yeh it must be so difficult*

J *So they train to find the norm so once they know the norm they know what the abnormal is and then they will work out what the abnormal means, so*

there is all these kind of notions of normality and I mean this particular image has got depth and in some ways the integrity that I feel it differs because it is less about telling the story of maybe what the vertible arteries do but in some ways

FD *Do you think?*

J *I don't know, I think it tells a different story which is about preciousness and this notion of fragility this kind of tortuous structure as almost like a jewel like and has a degree of symmetry rather than, but it might say something different to you*

FD *I see the symmetry thing but it makes me, you never see the vertebrate or I very rarely see it to be represented purely by blood*

J *The spinal column will go right in between those two.*

FD *I could totally tell that, it is making me thing about when I had work done on my back and I was trying to imagine it at the time, what was actually being pressed and pushed and manipulated and this, it has that kind of echoing of the form of the vertebrate anyway so it is really making me think of how these things inter twine and hold each other and it does have preciousness but not, it is a positive image to me rather than a negative one, it is quite informative I think*

J *Do you think it has sort of enhanced the data that it started with, not in the actual enhancing the story of disease but enhancing the story of the structure?*

FD *I think it could be, both the structure I think it could easily be a disease as well and It could certainly make you appreciate the complexity of the structure and the need to take care of it and protect it.*

J *I'm going to move onto the kidneys now. So straight ahead of you Sandra is called renalangeography but basically it is a process of injecting a patient with contrast agent and it fills the vascular system and you take a scan and this was done in the diagnosis of a condition called renal artery stenosis which is basically a blockage or a narrowing to the vessel that leads into the kidney and I can actually show you it where is, so that little divot as you follow the aorta down there is a little on our right along there is a tube with a little divot or nic well that is the narrowing, so this again a cross section of slices over one moment in time it is just kind of scrolling backwards and forward as they go through almost like the contours of the anatomy or a map. The image on the left here is the kidney on the left from the scan so it has been reconstructed and it has had digital lighting added to maybe exaggerate the form and there is a degree of shade and transparency been added to that you can see the internal structures, the profusions that work inside the kidney and obviously it has been orientated in a completely different orientation and a lot of the other information from that scan has been completely discarded in this image, maybe if I could ask you to comment on these images and some of the visual qualities you feel it has?*

FD *What was your, why did you orientate that way?*

J *I mean I think the kind of drive behind that was to really tease out the real*

harmony that was in the structure and actually explore this internalisation of the kidney rather than actually look at any of the other parts of the vascular system to look at a healthy kidney to just almost like give it some sort of aesthetic quality and maybe and loathe to use the word beauty but a kind of beauty that you could relate to the other things like in some ways I kind of saw a foetus in there and I saw a kind of brain structure and saw other things when I started to build this and I wanted to tilt the kidney at a angel so that would be exaggerated so in some ways it is not a truthful image in the sense it is not complete soul, I kind of slavishly showing what is there but what it is doing is really and I thought and what I was trying to do was really kind of exaggerate the beauty that is present within this complex structure and even something as fairly inert as a kidney have tremendous complexity in form, in shape

FD *It does become more like a sculptural image in those sorts of readings perhaps slightly clinched readings or maybe I'm a little exacerbated but the only reason for that I would say is because the image you would normally presented with is top to bottom of being the laws of gravity but obviously when you look at the body in a different way as you did in the first sequence of images with the tilting vascular system you interrupt a whole set of readings and represent them in something new, it would be interesting to see this one moving, all of them would be good but*

J *Well we have got some moving imagery further into this experiment, in terms of integrities do you think the integrities have changed or authenticates have changed because there is a degree of*

FD *I think it become a little bit too cinematic for me and it does make me wonder the level of ambiguity does make me wonder for a longer time what it is but this, there is almost a relentless drive when you see something is to what it is as opposed to just dealing with what it could be you care constantly searching for the answer and perhaps and I maybe contradicting myself*

J *No you are not*

FD *Its so open ended that is has a multitude of different readings but I don't know I sometime maybe think they are clogging where my actual interest in looking at the image and I think it is the lighting it is just so dramatic and that is because of the form and the type of textures that cover this structure I mean it is infinitely more informative than this, I'm more interested in seeing the inter-relationship between different organs whereas with this it is isolated in a sort of theatrical kind of space, as thought it was made of glass or resin, it has really formal sculptural values again you can imaging it being really on any scale some sort of autonomous object in space. I can imagine myself wandering though that structure the way you can't with black and white imagery, you are, that is chartographically looking down and mapping your state, you are happy saying that is bowels or kidneys or whatever with this you just don't have that option it is much more imaginative and really sort of magical.*

J *I'm going to show you another image which is the same kidney, it is the same data it has just been again orientated in a different way, it has been textured very differently, it has been lit in a very different way, kind of global illumination to it, maybe if I could ask you to comment on the visual qualities of this and some of the integrities?*

FD *I think this image in contrast to the one you have just showed me demonstrates the capacity of 3D imaging this is completely inert and it reads as bone and then it reads as something like a vegetable it is kind of dull and it looks like a photograph of like a plaster specimen in a case, I think this would have its uses in very specific places*

J *What do you think they would be?*

FD *Perhaps for, I mean it just looks like bone material doesn't it it looks kind of calcified and it is just kind of solid, it is inpenitrible and again it has a ?? clinched looking insight like a moon surfaces or caves or something like that, the other image both tells you about form and structure but it also tells you about texture and what is on from the side and you can accept the fact that you could both see a surface and inside which is normally not something that you generally do you normally have omitted surfaces or depths whereas the other image incorporates both and this conventional MRI imagery does that by virtue of its movement it allows you to move through, this almost feels like things haven't moved on very far in a funny way it feels like a very early stage of what I imaged digital imaging must have been like, although it is imploring the light and effects the background changes immediately into an object that I cannot image this moving about in a body and doing a job really it is pretty dead.*

J *Do you think is some ways this image then if you were to forget the context of it being used in a clinical sense but as a sort of stand alone artefact that might probe other issues in this sort of space, how do you think its integrity and its authenticity*

FD *It looks vulgar and it sounds sort of rude and I'm sorry but it looks like a first year sculpture project and where they take natural materials and try to move into some sort of modernist abstraction by adjusting the scale*

J *So do you think it is a dilution then of the data that is started out from?*

FD *I would say it gives you a lot less data in a less accessible form, I don't know if diluted would be the right word, just not sophisticated, not translated, not synthesised to the same degree or perhaps it has just gone along a very obvious trajectory*

J *Okay I'm going to show you some other images Sandra which is called an anuerism and I will explain what an anuerism is in a second*

FD *Its a blood vessel in the brain isn't it*

J *No it is actually*

FD *It is a little blockage that travels?*

J *No it*

FD *Just how ill informed I am*

J *You are getting close but it is all of those, it happens in all of those contexts but it is not actually what it is, it is basically, I will explain what this is and*

then I'll explain what it is, Basically an anuerism, well this scan is a CT scan so this uses x-rays to generate the imagery and it takes again cross sectional slices and this is going down into there into the abdomen and through the pelvis and this is trying to diagnose and it does diagnose a condition called abdominal aortic anuerism and basically that is a bulging that occurs at the bottom of the aorta so this is an abdominal aortic anuerism but an anuerism is effectively just a kind of bulging of the vessel and obviously it bulges and the walls thin so it is very dangerous because the walls can busts as they are very stretched and it happens due to a process of calcification which is basically a furring of the arteries this calcification is a build up of material and it literally is like calcium it is hard and crusty and it builds up and it causes a reaction on the walls and the walls thin and when you have a stroke often these bits of calcification break off and they head toward the brain and the lungs and the heart and that can cause a stroke and if it goes to the brain because they are quite chunky but equally they can cause a reaction where the walls of the artery bulge and so obviously that tube should just go down the same cross sectional thickness as the other tubes but it is bulging which is incredibly dangerous and they have to perform surgery because if this was to burst the person would die within a few minutes if you don't get them to hospital so this image here is a 3D reconstruction of it, it is a translation of that and it is trying to, basically it is a very most basic translation of that it is almost a true as you can get things in 3D and the process and that I use it is very basically coloured, it is an orthographic projection straight ahead there is no perspective on it, there is no lighting in a sense that these are just default lights that illuminate the object and there is a little bit of shading but it is very basic in that sense and maybe can I ask you just to comment on these on their integrities and visual qualities and what insight you feel they offer?

FD *Sure, I think it wasn't until you said that this was ?? from an earlier of a working image but certainly the way it has got the grid lines and this slightly kind of pixalated forms it relates to this in the idea that this is working imagery that for me has a application and a purpose there, I mean I'm looking at it I become quite aware that its open ended to my interpretation because I'm not fully in possession of the facts, the reasons why, I'm not looking at it from a clinical or a patient point of view I'm looking at it from a purely visual point of view, it is much less sophisticated so it doesn't support my thinking process in the way that the previous images do but it in terms of artistic imagery it probably keys into these ideas that people quite like about working imagery and the insight into how things are developed, perhaps in the way that, it has insight value as well there is so much that our culture is prioritised by this, this idea of seeing a secret things in a way that the other images kind of level it off which is actually quite refreshing as I'm really tired of that now, just the assumption just because you can see into a working process doesn't mean that that working process necessarily has something of value or quality to say, it is like brining it back to that one individual point of view as opposed to a collective point.*

J *Is there quite a lot of your own research*

FD *Yeh I'm very tired of the way that drawing and sketches ?? are treated it is interesting but it is tiresome that people just revert to the same way of thinking about images just because they have a few visual queues they don't think any differently*

J *There is some other images Sandra and they are basically the same piece of data but I'm just going to, if there is anything you want to add I will just pan through them and if there is anything you want to add. I mean how would you react to basically these three images you have seen in terms of the integrity, how do they compare to the integrity of this as this has got a diagnostic integrity, how does the integrity of this image*

J *I think because you have got the black background, it has the feeling that it is data that its context becomes subtle to the point where you can almost forget about it and forget that it is manipulated you just take it as black is a zero kind of value of its abstract space where things revolve and I think it has more dramatic lighting as well, it informs what you are looking at but I don't know, the skeleton almost seems unrelated to how I understand the aortic valve, the bulging it doesn't, I kind of think you wouldn't even need the skeleton there because I knew what is was and it didn't really matter I think it is so dramatic in itself and I kind of would be interested to know how far up the heart was*

G *Well this little left strand with like arms that is where the kidneys are and if you follow it right up again the hart would just be above then ends of the wall, as obviously the heart is situated under the sternum so it protected*

FD *So would that be the commonest point for that to occur?*

J *I don't know I mean they can occur anywhere, although the aorta they do occur a lot at that bulge I don't know why, it is probably because that is a junction point and there is a build up of this calcification and if they occur above those little strands, see these little strands, between those strands in the heart it can be quite bad because there is not much they can do because the thing that they do is they put up scaffolding they put metal in to keep the walls strong, to keep the walls in and stop it from bursting so they almost put rigging in there to support that structure and if they do that further up it can be bad as it affect the flow that goes into those kidneys so they can affect the kidney function, so it is quite bad, so the reason this was done was to sort of plan what they were going to do, I mean they probably knew this patient was sick already, I mean even just watching the radiologists look at this scan even without knowing the patients name or the patient who they were they can make conclusions like it is obviously a male because there is no as you go down the pelvis there is no suggestion there is various bits an pieces to suggest its female and also the second thing it is probably an older person because the spine is slightly distorted because obviously the cartilage in the spine compresses as you get older and you get bad posture so it is probably slightly an older person so there is all those sorts of things that start to give away but these things are incredibly dangerous if you have ones of these as unless they can get you to hospital at a certain time which is something like two or three minutes there is not much of a chance because they have to open you up to fix that and to get you onto a surgeons table in that time is very, so they really kind of want to spot these quite earlier but a lot of this sort of stems from this build up of calcification which in fairness can be caused by probably a number of reason like genetics but also life style is a huge ?? and lack of exercise and not eating properly causes these deposits on the arteries, Actually listening as well to the clinicians talk about it, I mean the stuff crunches if you squeeze the aorta if they go on and do surgery you can hear this sort of crunching*

FD *Oh that is gruesome*

J *Inside, so you think they are all soft and squidgy but actually*

FD *I was actually going to say that image there of the kind of bulging the quality of it, it is kind of solid and opaque like the opaque kidney structure whereas with your first vascular image where it is kind of sausages and it gives you a better idea of what the quality would actually be like and you can imagine you vessels better that this sort of solid form that looks a bit inprenitrible*

J *Do you think it is important thought to keep some degree of reality but keep it distant enough that you are not presented with reality but you are presented with an altered reality that it palatable*

FD *Yeh there is no way you could present them with reality anyway some of them would go nuts if they hadn't seen something like that before, I suppose I'm probably thinking about it from a slightly different tact, how not knowing much about it I would think it was important to learn not just about the form but a little bit about the function of these things and to appreciate how that can change through your own activity why else look at images of the body really, there has got to be some of baring between it and how you live or I think you will have a detachment if they don't think about outcomes and long term problems and that is not to say that is the only use of that imagery, far from it*

J *This is another set of images here Sandra that I want to give your comments on and obviously on issues of visual quality and integrity and what insight they offer but the image straight ahead of you is just a cross sectional slice of the heart, so it is not scrolling through slices this is actually like a real time reflection of how the heart pumps to this is the valve opening and closing and so forth but what I wanted to just explain in this one is that it looks real time but in actual fact it is like time lapsed, it has been acquired over several heart beats as the machine cannot keep up so it take one slice at one point and it will wait until the heart reaches that same point and then move it on a bit so again it looks like real time but it is an interpretation in many sense of real time*

FD *Yeh you wouldn't be able to see if would you*

J *Yeh it is too fast. This on the other hand is a slightly different image in respect that you can't really pin it down to one piece of data, it hasn't really come from one piece of information it has come from several bits of information to build this and inform it but the vessel that you see here, the tube that this stuff is moving down is taken from that kidney data where you saw the pinch, so that is some ways has got a degree of translation although it has been rendered and transparent so you can see what is going on and lit in a certain way, the movement of the blood going through this, the movement of these red particles or these red blood cells has been informed visually by this and by speaking to clinicians and starting and observing so it has been done through a process of observation and understanding and immersion rather than a process of translation and the movement has been slightly exaggerated to try and tell the story or use the narrative, the red blood cells again as well are not that size they are an exaggerated size and obviously stylised in a sense that red blood cells look like Smarties but in*

doing so again it is trying to enhance and make it penetrable to be understood and give this notion and feeling sorry of rhythm and movement in the blood cells and obviously they are not of course there is a lot more of them in real blood than there is here. So maybe if I could ask you to again comment on the visual qualities and what insight you feel they offer and any integrities that these images would have?

FD *Black and white image really, it probably might be interesting from a medical point of view but it doesn't tell me anything more than I already knew before it is just blurry, it doesn't do anything else, this has kind of got the story thing where you are going along and you are going to get to an end point, you want to see it again and again, you are involved here the way that you are moving through the structures of the body*

J *It has got a journey, it feels like you are on a journey rather than just*

FD *Very much rather than just being this kind of observer, perhaps this is because you have kind of triangulated all this evidence together on this.*

J *That is a good point I never thought about that, I kind of look at it in a derogatory sense it feels hybrid it is almost like a magpie approach to kind of grab in lots of bits of information but in some ways it is a triangulation of information to gain a sort of medium in the middle.*

FD *That is your capacity in a sense you would be able to other things and you can triangulate sources*

J *Well in some ways that heart is a triangulation although it is a fairly literal one, it is gathering the machine if gathering lots of pieces of information to make one real time*

FD *What sort of clinical use would that have?*

J *Well it is just to, I mean the really interesting thing yesterday was that a clinician described, it is really poetically this movement which changed this image for me so before it was fairly inert and fairly kind of like unpentable but he then describes it as almost like an eco system and I can see another pieces coming n from this just from this description ?? that it lets you see a lot of the movement of the blood as goes in here and goes through here and goes back out here you can see these valves flapping open and shut like little gates and they have like little parachutes on them, little cellular parachutes to stop them doubling back on themselves, because if they get stuck obviously the blood will ?? the heart will ache so if any of you thought well you see here is another valve so it is not sort of being forced through it is not like gates shutting and closing an obviously things like when you have a heart attack or the heart goes out of rhythm these become distorted they can double back and get stuck if these parachutes don't work properly you get all these things like infection can sometimes build up and if blood is sort of spirals behind these so you start building these levels of complexity onto a fairly inert image a fairly kind of benign image you start realising how affective and how useful it is to peer in, but you wouldn't know that unless you have got that knowledge to do that.*

FD *You have added a verbal interpretation onto the visual, ?? it on to it in way that other images, they are doing, there is more information synthesised in a*

visual form and now you have said that, of course I can see that

J *I mean these images as well, you could take slices of any point in the heart and you can move further down to see what is going on and then move back up so he would use this in conjunction with lots of other pieces of evidence to then, as you say triangulate a diagnosis so it wouldn't be used in complete isolation and it shows you the mia cardium as well, sort of closing and pushing the blood out back out again and down and you can see the lungs illuminating*

FD *Oh yeh aha*

J *That is the pulmonary artery that is feeding oxygen or feeding blood into the pulmonary vein rather than an artery, blood goes into the*

FD *It is the veins that feed the organs?*

J *Well veins feed blood back to the heart so the venial system so arteries feed it away so the arteries are pressurised so if you cut an artery it is really bad as they are pressurised and you lose loads of blood quickly but veins are not so bad as they are coming back so they are depressurised and they have valves as well so they are coming up the body to they have got valves to stop the blood going back up again so I think when the blood goes into the lungs they become oxygenated so there is deoxygenated blood so it must be coming back up the system because they are getting oxygen again because you are breathing. I mean it is fascinating it is like an eco system, you body is like, it is an incredibly complicated finely balanced microscopic eco and anatomical or macro eco system it has got lakes, caves, it has got weather patterns, it has got all the things we can see in the natural world that we have in our own bodies and it is almost like this, the heart is fairly central to that but*

FD *Your images certainly demonstrate that quite quickly and accessibly, special relationships and rhythms and things*

J *I'm just going to show you the last couple of images and then we will grab a seat. I mean it is almost like I've been given a looking glass into this world and I'm interpreting it the best way I know how and initially I started to interpret it just for pure information impartment to communicate what was going on but I feel now I am trying to impart much more than that now I'm trying to evangelise through my image the structure and the beauty of what exists rather than just purely say this is blood flow, this is how it works, this is such and such, it is almost like I've moved from that brief that kind of brief based process telling a kind of much more, I wouldn't say fine art but I would say much more kind of I'm on to asking broader questions, I want to sort of explore more issues through the media that I know best and the media that I work in. These are two kind of fairly kind of polarised images and these are almost like two extremes, this is an MRI of the aorta, one slice and this is inside the aorta but there is high degree of interpretation in this and maybe I can ask you to comment on these images in terms of their qualities and integrities.*

FD *First of all probably from the image on the left you know where you are within the body, again it is quite an abstract space it could be any part, probably the cells do change whether they are oxygenated or not, they*

certainly change in colour, whereas this in terms of the form is making you much more aware of the inter relationship of vessels as long squiggley structures so you are kind of either up looking down on or inside. This image needs other things

J *The 3D one*

FD *Or more of them or more images, even if I hadn't seen the moving footage to help me get context within the body and it also isn't necessarily suggesting that it is cells, it doesn't necessarily have to be the body, ?? the body either it could be something completely different*

J *I'm going to put up another image, just hold that though for a second and this is kind of moving this one on a bit this again is taken from the kidney data that you saw earlier and it shows that pinch, that divot up close and personal and it has the red blood cells added*

FD *Is that on the right hand side that is literally is pinching?*

J *Yeh, I maybe could ask you just to comment on this one compared to the last one*

FD *Is this pinching on the right here in the black and white image as well?*

J *No, it is a different one.*

FD *Is that just normal?*

J *It is not even, that is basically to do with the slice because the way the MR sliced but because of the appearance of the vessels are in 3D they*

FD *Yeh it is there but you can't see if just now*

J *It is behind so it is just the slice and you can see it glow white so that is fairly deceptive*

FD *I think that image is getting the idea across quit powerfully about what could happen when you have a build up of too many blood cells trying to fight their way through*

J *How would you describe its visual qualities*

FD *It looks like a film set, it looks like*

J *It is too cinematic maybe, landscape?*

FD *It looks like a kind of space scape yeh, it does look kind of landscapey as well but it definity has a much more contained feeling about it, that it is some sort of organism, yeh definitely although not necessarily human*

J *In terms of its integrity do you feel it has a degree of integrity?*

FD *Yeh I do, I think it is has a sort of holistic presence to itself it has its own sort of, it creates its own sort of context its own little work whereas the black and white images is just obviously some sort of documentation of something*

else, that would be and image that you could wander in or put yourself into wandering and obviously with the black and white one it doesn't invite that sort of participation. I think you could probably sit and stare at that for quite a long time.

J *Well I'll leave it on screen, do you want to grab a seat for the last 10 minutes and we will go through, I've got some questions I want to ask you just based on some of the themes that we have been talking about. I've got this table here I call this trestle tables the origin tables and before I ask you these last few questions I want to just use these as a sort of like props to discuss some issues and them we will sit down and I'll ask you these questions and I will kind of rabbit on a bit here as I want to get through quite a lot of material and then we will take it from there. What I wanted to do was first of all obviously when I produce these images it is not just a kind of button pushing process there is a kind of eclectic approach there is a lot of material goes into developing this stuff and it is ongoing even just to develop the short sequences and obviously a lot of the starting point is anatomy and gaining insight into anatomy and using reference points but again in some ways this is useful to a point it gives you some ideas of where you are going but these images are, and it is much an interpretation as my own images these are someones interpretation of what we think the heart should look like based on observation, high section, discussion, experience and so they are useful but in some ways they are stylised and definitely and interpretation maybe using traditional media as opposed to contemporary although some would be contemporary as well so that is almost the starting point and then you move into obviously looking as historical premises as well this kind of Versallisis kind of, if you go way back, this notion of kind of artists working in medical imagery, anatomy it is not a new thing and in actual fact these kind of historical precedence or instances or working in visualising the human body are actually very sophisticated and in some ways more sophisticated in some of the ways that we approach it here where we get rid of this external information, this kind of other communication, I mean he has got a grotto in the background here and he has got this very kind of theatrical or ethereal pose and it is definitely more than the sum of its parts and I mean obviously Rhembrandt's anatomy lessons it is telling us much more it is a much more sophisticated image and in some ways working with these types of projects I'm keen to sort of start building on that, on historically, and I think I mean a lot of this stuff you see and you have picked up on Sandra and there is a degree of space age sci fi influence and obviously it is kind of using a lot of reflection of the real world a lot of these micro systems what exists in the body do reflect a reality of the real world and there is a lot of synergy between these structures and the structures that are in the body and it is interesting that I'm starting to move away from this kind of boys own sci fi stuff and it is clinched that is used quite a lot in visualisation particularly in 3D because it is dominated by guys in their mid twenties like me and you can see it in film and television that there is a definite aesthetic that is fairly consistent and exists*

FD *??*

J *Absolutely and it is moving it away from that and keen to bring in much more ?? issues as well, I mean all the work has been informed by lighting even this sort of slightly kind of sci fi looking work has a degree of influence especially digital lighting which is incredibly difficult to manipulate and a lot of these masters are highly, very sophisticated and the tools that I have got*

are actually very primitive in a sense in comparison with the way that Caravaggio and particularly Vermeer used lighting and were using a fairly kind of restricted media particularly as the paints they had available at that time, they could produce these incredibly kind of optically sharp images almost and obviously they have been ?? in time but they kind of have this richness that I was keen to explore in my work and use lighting as a really kind of important ?? developing of this and there is other work where lighting has played a very significant part in trying to illuminate and give insight, it almost gives soul to the work you are building in analogue issues like grain

FD ?

J They are mine

FD Oh wow, what was that done on

J That is basically, I'm using a lighting technique and a sort of painting technique to get this digitally and basically that is just looking down a tube but it create a huge degree of sophistication on basically something that is inert as a tube, I mean it could be a belly button

FD It just reminded me of the Anne Begley show there was art ?? it is probably like this is the way but it was so ?? and ambiguous and it was kind of rehearsed this sort of ???

J and there is this sort of interaction with the medical staff which is involving both drawing and involves?? Involves like writing on anatomical diagrams there is a sort of tooing and frowing and all this kind of mixes round in the mix to produce the work so there is not a golden bullet, a button that is pressed to achieve this and it is a very artisan process and I suppose in some ways does that lower its integrity

FD Not at all, no

J Exactly that's what I'm trying to tease out from different people and brining in clinicians and artists and trying to see what their standing on this is, this notion of authenticity that exists.

FD If all this stuff wasn't here I wouldn't worry, if all this text wasn't here, bizarre little messages about R2s and have a nice weekend and old school sort of colour pencil drawing because you are analysing it, you are analysing the history of artistic visualisation, representation through practice itself and you are actually picking up licence from other people ??? your images have a purpose they actually have a reflective purpose as you are ??? and present that and they also have this capacity to build in written/verbal clarity to them but obviously ??? The people who don't acknowledge that I'm always worried about, I look at imagery like this for micro and basic anatomical representation for art students and we never pause to point out that what they are doing is stylised and that they are actually repeating very very old ways of ?? those initial ways of doing it hasn't changed over the course of the last couple of centuries and it tells you that the body dictates how you should engage with it and think about it, like a skeleton how you do a line drawing, students are encouraged not to think like that too much because you distract them, so they have to try and imagine the skeleton and they have to try and imagine the skin and they actually talk about what lies

between those things so it is this kind of void, imaging the void that students are not allowed to penetrate ?? but I think have to almost remain critical about imagery and what it is doing and not doing, what it is obscuring, is much of what it is actually and allowing to see what they say.

J *Can I show you a couple of things here on the screen Sandra and then we will grab a seat*

FD *This is great, is this how all your images start off?*

J *Well no, the reason I put this up is because this image here is a totally interpreted image it doesn't come from anywhere its come from my observation, this is a sculpted piece that I have produced as a result of observing this and working with anatomy, I've now gained enough insight that I can build, I get a piece of digital clay and I sculpt over a few weeks to make the shape*

FD *What is digital clay?*

J *It is just like a lump of like ?? like this but rather than the material it is almost like, if you imagine starting with a block of clay but it is on the screen so the computer, you basically just take a stylus and start drawing and it reacts to what is on the screen and you can change brushes so you can change a brush like in PhotoShop and then you go like this is it cutting into the material and then obviously you have got, I mean basically it is like a digital version of working with material like you would get*

FD *?*

J *No because you don't get the feeling of the material and you don't get the way the material reacts but it is a much more efficient way than modelling this tuff like traditional models would do it in 3D digital 3D as then obviously*

FD *??*

J *I don't mean traditional models in the sense of working with contemporary media, working with traditional media, I mean traditional modellers working with computers, modellers what work in animation, they develop, they actually sort of stitch it together like a jigsaw, it is a stitching process rather than actually kind of chopping into the material and forming*

FD *So do you think there is more of an opening the possibility of doing that and is that still modelled along the ??*

J *I mean people that are better at this, people that are good at this would be good at sculpture material, people that come from traditional sculptural backgrounds really kind of thrive in this environment as opposed to people who are not*

FD *It is ??? and if you compare it, as you say compare to the old software that could only produce certain levels of information you have a new set of options. Do you feel frustrated at times with what you have*

J *No because it does, you can do in one respect but it takes a lot longer to achieve something but then what you can do with it is amazing afterwards it*

is like initially people will say well why don't you just make it in clay instead of using the computer to do it and that is fine up to a point but then there is a point after that, but what can you do with it, well you can animate it virtually and then you can render it but all these visual qualities and these multiple tool kits that you can't do with a real piece of clay or it you do you would have to spend a lot of time and make multiple models to do the same thing and the you can animate it as well in a much more efficient way so it is almost like once you reach a certain point it does have its benefits but up to the first initial stages you struggle and I mean some times what they do is they speed up this process and they will actually get a model a sculptor to make the stuff and they will scan it in, so getting past that barrier, maybe are going a little off here so I'm keen to kind of stick to this notion of integrity to the reason I've shown you this as you make any interpretative image or an image that is absolutely come from the imagination of an artist does it lose its integrity does it change and then when you start building in influences which I want to show here on this screen, I'm just whistling through this stuff because I think we are getting ?? I want to just show you one image and it is fairly a kind of tenuous link but I think it highlights this importance of observing a natural world and using it to inform the way you construct images whether it is for a patient or if it for a general audience to allow you accessibility to the imagery and this image here was taken in the Museum of Modern Art, sorry the Museum of Natural History in New York and it is not a great photograph but it is sort of highlights something I was really interested in the time and it was this notion of structure and symmetry and I was producing this 3D work at the same time and so building links to the natural world and working with and probing, I mean I would never have found that image I don't think because there is lots of scientific data I had on my machine at the time if I hadn't gone through and seen that structure and thought that matches something from the real world, so it is building and so other people have gone to that and I think that is why it is important to involve artists in this arena of medical communication and almost like visualisation internal body space which seems to be kind of be constantly dominated scientific instrumentation but maybe hold that thought and we will maybe have a seat Sandra and I'll ask you some questions. I know that is a really rapid and there is probably loads of stuff that you want to want to unpack but maybe if I ask you these questions it will maybe contextualise what we have taken through. What would you define as visual integrity in your own practice Sandra first of all?

FD *I think the course of the work I've been doing I've had quite set ideas about what the visual was about and what it could be used for and my PhD I spent a long time unpacking my own resilience to ways I had been taught to think about image making and imagery before em really getting away from the idea of the image as the outcome and as the pinnacle, images as almost being something quite disposable and whether to dwell and think about them or just move on and disregard, ignore them and get rid of them, I'm much less previous about imagery now, much more able to interrogate it and ask it what it is doing and I think that would be my idea of integrity is how I sort of critical self knowledge of why we use images and to what ends but not just so that I can plug it down into being one thing and secure that*

J *Do you think authenticity and integrity is so interwoven with practice as an artist that it is constantly moving targets it is not a static thing it is something that changes depending on the context, project*

FD I think it does but there is a whole, you cannot remove yourself from you professional context and it is undeniable pressure that comes from without yourself to be seen to be working in a certain manner, producing certain artefacts according to an acceptable notion of style which people don't like to think there is such a thing a style or multiple styles but with people who are uncertain about how you are working these things very quickly come to the surface and trying to look at life drawing as being really difficult because I don't want to be stereotypical about it I simply want to ask what it does, whether it is effective, can I ask, can I use that structure, visualisation to think about other things whereas other people want to use it as a cultural war on certain ways of thinking abut the body and are tied into them and refusing to move along and they want to see me as part of that vanguard and I'm not

J So you mean people see that life drawing as a redundant tool of visualisation in the body and the other camps sees it as something that is an integral part of being an artist

FD One sees it as completely threatening to contemporary sensibility the other see it as utterly fundamental to a traditional sensibility to me the traditional contemporary don't need to be exclusive ideas and I think the way we think about tradition is flawed but what interests me is that both of them call it skill and because they do that they can keep things that are uncomfortable at arms length because they talk about skill but they don't actually talk about how you apply that kind of thinking and again both sides were just the visual down to something very flat and very shallow rather than a way of thinking they remove the idea of thinking from images which is just mental I think, I don't see how you can and It doesn't end up being something, I'm not going to use the word illustrative as that is, I've got a problem with what, I've seen a lot of this kind of thing, particularly looking at anatomical imagery what is illustrative what is documentary and then what has this other sort of value the illustrative usually denoting something that has one or two meanings of very shallowly presented with not a great depth or quality of information or meaning there whereas something, the photograph is often subject to that criticism and

J Is that what you think?

FD Oh no not at all, but people assume that drawing has this automatic level of meaning and usually the way to do that was to link it back to the hand and unique author which I'm happy that we have kind of tried, contemporary art tries to dispense with that rather than you looking and re-examining that fact

J Yeh it is interesting isn't it, I mean there is certainly certain camps would judge my work as purely illustrative in that sense and would judge it in a way you just described which is shallow and not giving any great insight because it is too representative of reality and it uses something called beauty which ?? are rally scared of mentioning as artists and then obviously then an insight into beauty is almost like a negative thing and obviously seen as some sort of as you passé, something from history that we should be moving on from and so, I mean that is only from one camp I suppose, one area and obviously there are things like as well working with a patron, if you work for a patron you are somehow not seen as an independent artist, the stereotype of a tortured soul that produces work who is often male and has no money and no life is seen as the kind of benchmark that is the out there

the kind of going against the flow, the clichés that all exist seem to exist in our world as much as they exist in the tabloids in the public domain they seem to prevail even in other professionals or people we would regard as professional and that is a conflict for me because I feel that beauty and insight and structure is not a, it is something that there is a story that I'm trying to tell and it shouldn't been seen as, it is not shallow by any stretch, it is actually a very complex thing trying to communicate and so I suppose, I mean that brings me onto my next questions which is what role do you feel artists should play when working with medical scan data and working in this clinical context and some of the words that have been used is translator, mediator, illustrator, how would you term it Sandra and how would you kind of try and verbalise some of the stuff and the role of the artist?

FD *There are three really different ideas, translation suggests you move from a source object to a target object and you have a set of criteria to do that. Interpreter creates a relationship between you subject and your object, mediator your illustrator is much more one dimensional going in one direction, I am kind of kicking about the words translation and transmissive in my work, you were saying earlier about, we were talking about digital tools that you can get to a certain kind of crisis point and then you can move beyond the way I have kind of thought about printing and the use of imagery is that things or structures are kind of set free because they are set on this kind of mutual level where they can be reproducible, the kind of have their own integrity, their own autonomy which now no longer has anything to do with me but can be picked up and not just carried across but it is the carrying across part that actually matters, that is probably your role in this sort of, I don't like the word translation because it is just too decided but when you are picking up and carrying across it is a model that allows you to bring in lots of different things that normally are treated an incompatible such as the written, the verbal and the visual, that becomes your methodology to explore different pathways so the word, I don't think I could actually just pin one word on it*

J *Absolutely it is a much more complicated issue, I mean in some ways when you look at the layout of the origins table in this, like you say this contextual interaction this one-to-one action, the historical context it is almost like you are gathering all these issues and you are on the ground, I mean I've done what you call a residency in art would be called a placement in medicine, I've spent and extended period of time embedded in the medical context, I've learned a lot and that is much part of it and I've related to what they are doing over coffee, I meet them over coffee and I interact over lunch and the chance encounters that go along on that process actually you discover that you do some really good work from, it is not the kind or orchestrated meetings that you make discoveries it is the cliché it is the kind of down the pub with the beer mat stuff although in the hospital context it is different but it is those chance things when you walk pass a screen and see something and you think oh that looks really interesting, and so if you were to say translator or some of these descriptive words they almost discount that aspect of it they don't include that part of it, they don't include this immersion, this process almost like osmosis that occurs that allows me to produce a lot of this work and allows me to sort of move the work, I mean in some ways the work as I keep kind of saying the work started off as this kind of fairly brief orientated almost like design model which was I come in, I see a problem, I solve the problem and produce artefacts to solve that problem but what I've discovered is a much more kind of complex process and*

almost like, there is much more issues that I want to explore now because I see this stuff constantly, I've got this looking glass into the body now, I've got this equipment that see and provides me with materials to start with and not just the machines, the people, the people like the parachute analogy like the valves flapping back and forward and obviously I met an immunologist yesterday who did this experiment and she described how the immune system worked in really a poetic way and it was great material to start building some new work from, excellent material to allow me to sort of hack into this, like we discussed the digital clay or to translate it or to be inspired by a particular Vermeer painting and produce work that may have relevance to a one-to-one patient interaction or equally may have some relevance to fill a room full of porcelain kidneys and so there is this kind of confidence struggle that I'm having, it is like I swing from one end to the other but I don't think any of theses words like they say describe the process that I'm going through and almost like the constant refection in all this as well which is what a PhD allows you do, it allows you a latitude to record and I mean the last question I have here Sandra and I know you are probably dying to say lots of stuff I can see that I've sown lots of seeds in your head and they are in fast forward now and they are kind of braking through the ground ready to launch into something, but the last question I had was do these types of imagery and the stuff we have talked about affect the way you feel about your body, your own body?

FD *I think you images do much more that the conventional medical imagery, but I was kind of thinking that the other night, there is no way the imagery will make me feel the same as if something actually happens to me, if I actually cut myself badly, or even if I get sick probably it is just m y personal problem but yeh cutting myself or something like that really brings you right back into your embodied state in a way that images just can't and an image just still allows me to be detached about it*

J *Gives you a distance it gives you a buffer zone doesn't it*

FD *It does and a lot of stuff I do, the kind of drawing practice I will constantly interested in embodiment and the idea that you move between states of self awareness or projected self awareness which you never can achieve that full state but never having really had thanking fully being ill, I think it is quite hard to make a comparison, I don't know*

J *I think you are absolutely right, it is interesting because I think a lot of this stuff doesn't have any relevance until you say it affect you that the kind of anuerism stuff really resonated when I brought my parents in here because they know people who have had this and they have heard of it and they don't know what it means and they were really asking a lot of questions and engaging with the imagery and wanting to penetrate what they were looking at because it had relevance to them and that is really interesting it is almost like you have got a captive audience in that sense so maybe if I tackled a disease that had more relevance to a specific group it would probably change the way the viewing perspective.*

FD *It would do, I can imagine if you were tying to find information about a certain problem or disease and usually for most people it is referenced texts they have access to, trying to make the leap between like coloured pencil drawing and actually what could be happening makes the unknown gap even more terrifying because to me being informed, mind you some people*

don't like that, some people want to be in denial, they would be horrified to actually see, they would refuse to see imagery of what it is that is happening to them because they can't make the link between behaviour and imagery

J *Well it is almost like ignorance is bliss, to be incomplete and you denial or you just feel you don't have the medical capacity to cope with like the realities of what is happening to you, you just lock it away, it is like people that put their band statements in the drawers almost and don't want to face the reality of the debt that they are now accumulating, it is a similar, it is not quite the same with disease but it is a similar, I mean there are other things that we haven't even tackled which is the audio and the almost like the smell of tissue and the way the kind of texture and feel of it in terms of the way it moves and squelches in body, I mean there is a whole other aspect, like the crunch, almost like an onomatopoeic aspect of the way that, I mean I would love to work with a sound artist I think that is my next port of call is to just to think that images change again, they change the position again when you add a sound as well.*

FD *Yeh I think maybe in that case I wouldn't , weirdly the imagery can be probably quite related to the body but I would be really careful that between sound and image it doesn't become illustrative, that would be a difficult one, I don't know that might just be a whole new project*

J *I mean it is this, I mean we all do have this fear of illustration we all have this, I think it is much more prevalent in fine art than it is probably in design but there is a real kind of am I becoming an illustrator, oh good God do I really want to go down in history as someone that just translates for my patron but this isn't a new problem this isn't exclusive to contemporary media, this isn't something that contemporary artists have suddenly found and come across because they have had some great insight, I mean Caravaggio and even Leonardo and a lot of the kind of Michaelangelo they had all these struggles I mean they could have been killed for not illustrating, they could have been taken to the gallows for heresy because they were trying to create an image that maybe had some degree of abstraction or insight and so it is funny that you are saying this Sandra, as it is obviously something that you come across constantly*

FD *It probably wasn't until recently I discovered the contemporary art as long as you demonstrate self awareness and you can call something a methodology you do what ever the hell you like it doesn't actually matter what it is you can be deliberately illustrative, deliberately anything but because you have that trigger, that self awareness you are allowed to say, I always imagine this methodology thing as being a box, you know where you stop and it starts and you can choose to come in and out of it, for contemporary point of view the figurative lovers are unable to come out of their box, they think the whole world exists in that way and they get ridiculed for it, so I don't think I would worry about maybe being too illustrative and you have an awareness of that anyway so you would investigate, doing the comparison between, I don't know for it is the difference between static and moving imagery is really important and comparing it, I mean the eye is just so drawn to moving imagery, as I was sitting here I know what things it is I'm looking at but I cannot stop looking at certain moving things and even like the beating heart the imagery it was kind of dull and difficult for me to understand until you pointed certain features out but even then that was what drew my eye, I just can't get away from it which is difficult because I think when you have*

moving imagery people are less inclined to actually think, they are more inclined to sit and stare

J *I mean we have, I think not us and not you and I specifically but I think Joe Public has lost the ability to look and find poetics in things, if you look back in the first war trenches and sqaddies effectively were carrying books of poetry and this ability to look at an image, we kind of live in a world of digital neo baroque we are bamboozled with like constant incredibly fantastic imagery and beautiful structure and form but we become numb, we don't actually look any more we just like become, we watch it over our tea, we kind of watch it, we don't sit like this and observe and discuss not that I'm expecting Joe Bloggs in a flat in Lochie to observe and really kind of gain some great insight but even just looking at things and realising the craftsmanship that might have gone into something like that, I mean we are quite happy to look at a Mercedes Benz or a Porsche and say that is a beautiful car it is a nice piece of design and it goes very fast and look at the engineering but no one ever looks at a freeze frame from any half decent contemporary film or a good art director, a lot of the imagery will stand up on its own, a freeze frame from it but played in sequence, maybe just let it wash over us, it is kind of bizarre, I'm on a sort of crusade on that front and I'm probably letting my own, I'm going to stop the tape Sandra*

2.21. Oncologist A

Interview with Oncologist A
Date: 25/10/06
Time: 14:00
Duration: 1:04:44

J *So I've got a microphone here Alistair so it is really important that I try and record what you are saying so if you can, that is perfect just sort of hover round there so I pick up our voice and then I can record what you are saying, this is a new recorder that records onto a digital memory card so I'm always worried that it is not started because at least with a tape you can see it turning.*

OA *It whurrrs*

J *Although the clarity of the sound is excellent, it is CD quality which is great when you are tying to play it back. Basically the way the screens are split up on the one had we have got, on this screen I'm going to take you through some medical imagery and these are very much traditional radiologist images, both CT and MRI and what I want to do then is simultaneously at the same time bring up a series of 3D reconstructions that have been built as a result of that data and I want to you make comparisons between the two and I've got a series of questions but what I will do is I'll bring them up and then I'll give you a sort of brief outline of what you are looking at and then I'll leave you for a few seconds to reflect and take in what you are looking at and then I'll ask you , I've got pretty much four questions per set of images. It is all based on the vascular system so these are all images based on mostly kind arterial and renal angiography.*

OA *Am I supposed to be looking at both screens at the same time*

J *You can look at either or, maybe look at this one for a bit and then that one for a bit and then I'll explain what you are looking at, maybe I could just run through what you are looking at as you are looking but the image straight ahead of you the two dimensional very kind of classical radiological image is taken from MRI and as you know MRI is a process of magnetic resonance imaging and patients are put on a table and put into the boa or the magnet for around 40 minutes often and this case, this particular case maybe 30 to 40 minutes and what is shows is, it is highlighting the vascular system and the bright white signal areas are the arteries as I'm sure you know. The image, and these are cross sectional images so this is not any real time animation as such this is just cross sectional images going backwards and forwards, this is sort of one moment in time that has been preserved while the scan was done. The image on the left here is the same piece of information, it is the same data but there has been a degree of interpretation, there has been digital lighting added there has been colour added there has been texture added to a point, there is also a series of camera angles that have been set up to pan round the object to try and explain to try and describe the form in a visual sense and it lasts around 10 seconds. So the first question that I had was, were there are two questions actually and they are sort of linked so I'll ask them together and maybe you could give me your response Alistair but firs of*

all describe in your words what insight you feel each one of these image offer into the human body and how would you describe the visual qualities of each image?

OA *It is difficult to answer in a straightforward way as I'm kind of used to looking at MRI so obviously I most comfortable with that mainly because I suppose what they do particularly in my speciality which is, it actually involves taking two dimensional images and creating three dimensional mental reconstructions because what we do effectively sculpt in our case ??? to it a three dimensional volume that we define off two dimensional images and I'm very comfortable looking at the traditional MRI image but what I find looking at the left hand image the reconstructed rendered one is I find it difficult to orientate myself until I can find what I take to be the circle of will it is up at the top end and then I can move south from that and work out that I am actually looking at the vertrible arteries as they go up and eventually feed in at least that is my impression of what I'm seeing.*

J *That is exactly what it is*

OA *In terms of my understanding is just because of my age and where I've come from I probably find it easiest to stick with what I know I suppose the insight that you get from looking at the interpreted sculpted image is that it is actually more complex probably than you actually appreciate and because again when you are looking at a two dimensional image even though you are mentally reconstructing it into three dimensions you are picking out bits and looking at the parts not at the whole, looking at the parts of the whole system in three dimensions off a two dimensional image whereas what you are showing on the left screen there is pretty much the whole interpreted and then when you look at that you realise actually it is, you look at the whole lot together it is more complex than maybe you thought firstly, sorry thought at first and of course I'm looking at again because again because of my background I'm looking at pathology all the time so I'm looking at the three dimensional reconstruction and looking for narrow bits or ?? or strange things.*

J *Anomalies sort of thing*

OA *Anomalies exactly.*

J *I've got a third question for you Alistair and it is a little bit of a loaded question and it is probably slightly ambiguous but I wills sort of give some context but do you feel the interpreted image on the left the image that I've produced and as I said there is a degree of interpretation in some senses some of the information has been deleted, do you think because it is interpreted do you think it has less integrity due to its abstracted nature from once it kind of began as it were it origins were in scientific scan data*

OA *As far as I'm prepared I don't have a problem with deleting/editing and reconstructing because if you think of the image where the traditional MRI methods that we are looking at that in itself is an interpreted reduction of a vast amount of data on vertribrations on magnetic fields the number of data points that go into that image is I would suspect in terms of singling theory if you like I'm not looking at all the data anyway am I when I look at that, vasts amounts of data have been taken from that equipment from that image and*

themselves been subjected to if you like a editing/rendering process to give me the traditional MRI image so to do a little bit more of that is, yeh

J *Do you think and we will delve into this a little bit more as we look at some of the other pictures but because this image has been developed as part of a scientific model in pursuit of a truth, a model that has a degree of reproducibility there is protocol that has to be followed and irradiation of error is constantly at the back of the mind as the radiographers do these pictures do you think then this has more weight then or do you think it is just for different purposes I suppose really, I'm sort of asking another question there*

OA *I mean, you know again you can get into all the philosophical questions, what is reality so is that MRI image real, no of course it isn't it is the edited highlights if you like of a whole load of information on an atomic pertivations summed up in a way to the people who developed the MRI software seemed appealing to the user so we do that all the time and I suppose if you want, your thoughts on the true spirit of scientific enquiry then it would go something along the lines of your approach to truth or the extent to which you approach truth will be directly proportional to the number of different routes and angles that you use to look at it so the problem always is in medicine particularly in imaging and imaging is a lovely example that MRI was going to replace CT as a sort of, it is either or and of course it isn't I mean CT and MRI gives different views on the same reality and what you are showing on the left hand screen is another view of the same reality and again perhaps with some interpretation in it and the interpretation happens to yours rather than the imaging algorithm that the MRI software uses and I don't want to sound rude but I suspect that your interpreting or the interpretation that you have done there could be coded as an algorithm and actually you could just*

J *Interesting it has probably got much more bearable inputs as an algorithm*

OA *I mean you can use random number generation and things like that if you want or it is almost like a Monte Carlo approach if you wanted to do it, if you were an imaging equipment manufacturer who wanted to give people what you have shown me on the left hand screen I can't see that that takes you anywhere out of the box in terms of what is actually available and feasible it is just an active will to create what is needed if you wanted as I say to replace John McGhee by an algorithm.*

J *Okay this is good stuff, I want to just slow things down a bit and show you some stills and I'm going to just put a still from that sequence up as a reference point and I want to show you some stills taken from the sequence but they have a degree of interpretation this is what we call in the arts a collection but it is various viewpoints on the same piece of information but there is a degree of interpretation using a slightly different visual language in that sense but it is the same piece of data that is slightly different, what I want to do is just pan through each one, I think there is 4 or 5 of them and then stop on one particular image and take you through and I will leave this constant as a reference point, so I will just pan through these and then we will stop at one and use that as a sort of discussion. So that is the collection and now I'll just stop one particular image and it is the second and I just, I would like to kind of get your comments on this Alistair in terms of what insight you feel this images has and what kind of visual qualities you feel it has*

OA *It is obviously the way it is done you have a sense of depth that you don't get off the traditional MRI type image you have a sense of ?? into something and again it comes back to what I was saying earlier it does covey a complexity, it also because of the curves and because of the lack of symmetry it conveys a much more biological impression if you like I mean there is more, I'm looking at this and I can see a picture of some elephant trunks or something next to your table and I don't know if I was supposed to have seen that or not and I'm thinking Darcey Thomson and growth and from you know the same forms keep cropping up and the curves have similar radius's and there are mathematical explanations for that to do with growth rates and developmental rate and differential growth rates and there is an entire calculus so these are the sort of thoughts I'm having randomly looking at the left hand image whereas the traditional MRI image and I don't know if this is because I'm used to it were because it is an intrinsic property of the image itself but it doesn't and it sounds weird to say it because I know that images comes from a living person but it almost seems less biological so I suppose maybe that is more alive I don't know it is static so why would it be static make it seem more alive*

J *I think is have a little bit more soul*

OA *I think so, soul to me is a kind of music you see I'm afraid. But those are the sort of thoughts it provokes and the fact that there are parts of deliberately out of focus which in one sense give you a sense of perspective and depth but also in another sense conjure up clouds of unknowing in other words whereas that is a much although technically that is not a hard image it is a hard image to somebody that is used to seeing it that way even the shades of grey are much more if you like brutal and less ambiguous on the MRI than they are on the where that is a much more ambiguous image in a sense it brings that home.*

J *Do you think it has a feeling of preciousness and fragility as well because of the*

OA *No it is interesting yeh the trouble is I know what an artery feels like in my hand so I know that that is rubbery and grisly and not particularly fragile at all it you had showed me the same using veins then I probably would have claimed a sense of fragility.*

J *Okay I'm going to move on to another set of images, I'm going to move a little bit further down the vascular system to the kidneys and look at some images, I think you may have seen this image before ???*

OA *Given my memory that is not difficult*

J *Well you probably pass it everyday when you walk through the*

OA *I do, well I know which one, the prize winning one*

J *Oh yeh that was good that was about this time last year it is quite scary how a year passes. The image that you are looking at straight ahead is, you know is renal angeography and this is an MRI scan performed at Ninewells to sort of in the diagnosis of a vascular condition call renal artery stenosis which is a condition which involves a narrowing or blockage of the vessels that feed the kidney due to a build up of arterial plaque, the image on the left here on the*

other hand is the kidney on our left the healthy kidney it doesn't have the stenosis it has been reconstructed and it has been reconstructed, the image has been relit to describe more of the form, it has been orientated in a very different way and obviously information has been deleted or not presented in this particular image and there is a transparency been added to the shade up to give some insight into the profusion and structuring that the internal aspects of the kidney as the kidney absorbs the contrast agent, maybe I could ask you to describe these sets of images Alistair and what insight you fell they offer and their visual qualities and whether you feel they have a degrees of integrity?

OA *starting with the MRI images they are pleasantly stark from my point of view there is a blackness it holds no colour there and again I'm used to them I don't know if I have to say this isn't something that I would see everyday far from it this would be unusual for me to look at but obviously the whole thing is set up in such a way that they kidneys are bright and everything else is shadowy so it focuses my attention very neatly on the organ that we are interested in ie the kidneys and to some extent the aorta which also shows up brightly and everything else is like that nice blurry sort of grey and blackness as I look at it, it is funny looking at that there is an etching by Rachmananov set, the Isle of the Dead and I think it is a famous sort of visual icon and I can't remember who did it but it was some German Casper Freidrick or some name like that and it is just the colour for some reason the sort of sense of the MRI is almost that sort of aesthetic if you like whereas the kidney as shown, picked up turned round, upside down and back and front that I would never be thinking about seeing the kidney like that unless you see it in a kidney dish of course which is why the dish is called a kidney dish em the rendering there with the transparency for most of us of a certain generation and there is this thing that you could buy in model shops called visible man where it was basically you could assemble a person it was like an Air Fix kit but of a person and again that sort of transparency was used throughout so that when you had finished completing the kit you could see through and there was this shiny surface that was the skin and the organs were sort of suspended within almost by magic exactly, ??? collecting system suspended within the substance of the kidney in that image so interestingly and perhaps perversely the MRI summons up to me, as say an etching from the late 19th Century whereas the more artistic image actually conjures up for me something made in plastic from the 1960s and that is just individual variation.*

J *It is interesting though because that has a degree of abstraction to it and because of the artefact due to the subtraction process you get this kind of shimmering like charcoal effect it does kind of give a connotation of traditional media whereas obviously this is*

OA *Yeh okay I think you are saying much more succinctly what I was trying to say I mean charcoal is what it is and I was thinking about lithography and things like that where there was that random patterning thing that has got nothing to do with the hand, it is in the stone, it is not in the hand either the pattern comes from the stone and not from the hand of the creator the artist and*

J *It is interesting I mean what do you think in terms of their integrity Alistair do you think their authenticity do you think*

OA *My feeling on that is the ?? before they are both artefacts in that, I mean I have a, if I didn't know what I know about kidneys then I would have a much better sense of the kidney from the left hand image just in terms of that thing imaging what it would feel like in your hand would be much easier using the left hand image than the right hand image, my problem is I've sort of held all these things in my hand and I know what they feel like anyway so I don't need, so that is the difference between me perhaps and a member of the lay public.*

J *It would be interesting actually to get you to write down the texture and feel of them just to sort of verbalise them all these different organs because obviously that is something I've no insight into and I'm obviously trying to translate them in the way they visually look and the way the*

OA *Yeh I mean these from your point of view ??? pigs kidney a human kidney are very similar I mean both in terms of dimensions and obviously in terms of texture*

J *Oh right*

OA *because a lot of the original transplant work on the kidney was practised on pigs you will be a vegetarian soon you might not be able to that not without*

J *No, no*

OA *Not without horror, that is actually quite a good way*

J *I'm a carnivore through and through I have not been turned to the dark side although you are probably more prevalent to vegetarians in the arts I think than in science.*

OA *That is making an assumption based on your occupation and it is entirely unwarranted.*

J *This is another image Alistair I want to get your input on, it is the same piece of data, it is the same kidney it has been visualised but again it has been orientated differently it has been textured it has been illuminated very differently and I just want to get you comments on the visual quality and insight this image provides.*

OA *I mean the thing about that one is it looks dead, I mean it looks like the sort of thing you stumble across when you are up on the moors and there are sheep skulls and deer skulls and bird mandibles and things lying about and has got than bony skeletal bleached feel to it I mean if you asked me, you know, does that image truly communicate to an lay person what a living kidney would feel like if you could pick it up, I mean no way, it is all sort of beaked and sharp down the bottom there a uriter has been shattered there is no sense of give in it at all it is a hard skull like surface that is what it looks like to me and I kind of in terms of does it have any honesty in terms of conveying the kidneyness of a kidney, no, sorry to be rude.*

J *No, this is what this is for I'm trying to get a feel from everyone who are navigating through this. Now where are we going to go next, yeh I want to have a look at some anuerism data to cheer us up this afternoon and this is a aortic abdominal anuerism not that I can pronounce it properly*

OA *Just call it AAA*

J *Yeh triple A, although triple A to me seems something to do with like planes and antiaircraft fire across war torn Germany*

OA *Or the American Automobile Association which does exist and is know as the Triple A.*

J *Now we are moving into CT so this is a CT image which you are probably kind of quite used to and obviously probably don't need to give you a little explanation but this is a cross section of slices going through*

OA *I've seen it already actually*

J *Have you?*

OA *??*

J *It is pretty large, and this is the 3D reconstruction that has been produced as a result and this is the first level of interpretation so in a sense this is the closest I can get from the data based on my process of interpretation and there has been very little interpretation and there has been basic shaders added it is a kind of orthographic projection straight ahead so there is no perspective on it just some shading to suggest, there has not been any smoothing on it so obviously here it is picking up the artefacts of some of the tenuation that is happening in an x-ray set of bones so you are getting this kind of pitted effect on the*

OA *Well you are also getting it on the anuerism itself because of the calcification of the walls of the artery which give it that very un-anuerisimal very un-aortic look.*

J *it is almost like a relief print isn't it of the terror*

OA *I mean I rather like the bones actually because the bones, I mean in that rendition the bones look bony you have a sense of something that is durable and supportive and three dimensional and strong which of course the spine and pelvis ?? bones there are and then you have the daftness of the 12th rib floating there for no reason that I know of, the rest of the rib cage makes perfect sense because it is all articulated but I have never understood the 12th rib.*

J *Oh that is an anatomical anomaly not the scan?*

OA *No, no that is just a, it is a ??? why we have this fastdual rib that floats down there attached to nothing.*

J *Maybe it is some sort of*

OA *It is just an evolutionary remnant I think and in another six million years it will disappear probably.*

J *Like your appendix?*

OA *Eventually yeh.*

J *And in terms of integrity how do you feel this one then operates Alistair in terms of truth*

OA *It has got an attractive earthiness to it but by not being editorial and by accepting artefact then actually you to some extent falsify it don't you*

J *Yeh because you are taking the mistakes from the original.*

OA *I mean they are not even mistakes they are quirks to do with the fact that the atomic number of calcium is higher than the atomic number of water or soft tissue and so you get differential attenuation of the x-rays used for CT scanning so you get this rather sort of slightly torn appearance to the front of the anuerism, in fact it is a long time since I've seen an anuerism but I don't remember them looking like that*

J *Well it would be a lot bigger because that is lumen isn't it*

OA *Yeh that is not the wall but the wall is stretched over it of course at this point*

J *It doesn't look*

OA *I suppose the CT I'm just so used to I can't even sort of assemble the aesthetic about it I am doing that thing that I was talking about earlier of turning it into a three dimensional thing so you are starting to look, okay we are just picking it up just below the renal vessels it is starting to bulge a bit and it has bulging right down to the biofocation so that tells me roughly how long it is, I know that is roughly speaking two and a half vertebrates worth and a vertebrate is two and a half centimetres roughly speaking so and in terms of width there isn't scale on the CT but it is about as wide as a vertebrate so that is going to put it to around five centimetres, six centimetres wide so you are doing all of that in your head as you are looking at it.*

J *I think they were doing this scan before they were about to fix or do some scapidem so I think they were, from what I gather from the radiographers that came in probably looking to see whether they could graft in, if it was long and sufficiently far enough away from the renal arteries.*

OA *It is the, it is also whether they need to have just a, there is a thing called a trouser graft where it actually has the biofication and whether you can just graft this, the tube bit and that is unusual, I mean usually they are down into the biofication, I'm not on my specialist subject at all.*

J *I am convinced. The next image, these are just some almost like some other views of this piece of geometry and if there is anything you want to add to what you have already said*

OA *I think that is just that makes the barnacles which are artefactual look more obvious you have a sense from that looking at it from the front but it gives a nice sort of bulge feel that.*

J *And this is the last one, just the same one*

OA *quite similar to the first one but it has a different background.*

J *It is interesting some of the artists have commented on this one and they like this image because of its clarity*

OA *And because you slide the background you mean?*

J *I don't know what it is they just seemed to be, it is almost like an education process that they were trying to work out what the black bits were*

OA *Oh on the scan?*

J *Which is air I think in the intestine isn't it?*

OA *Eh the black bits mostly that is air in the lung and then the black bits the streaky black bits are mostly fat actually with some air in the bowel but the main grey black that you see on those transverse slices are in fact fat in the mesentery and immediately below the skin between the skin and the muscle.*

J *It is interesting because it is like depending on where you have got this perspective you are in awe of each set of images because this is completely new to you and you realise this is a scan of this space that we all have within us you have an instant awe although you can't navigate through it you think oh wow and I think we found this in the sort of clinical staff that we have down so far, they have obviously they had never seen images look so rich they have an awe of the rich imagery and you get this kind of constant and then after a time there is an equalisation happens and it is almost like a, oh all right okay and I can see value to both now actually they are not that much.*

OA *I think that goes with what I was saying earlier that this idea that everything has to be awe is excessively naïve I mean it is actually to use the sociological jargon it is triangulation but if you look at something from three different perspectives you will get a much richer impression of what is really going on than if you look at it from only perspective and so this is exactly the same process to me this is another angle sometimes literally another angle from which to view the same problem.*

J *Somebody said exactly the same thing earlier, there was an artist said this process of triangulation, it is interesting though when you think about this sort of separation and the way images are judged have got to do with almost the polarisation of the, almost like of the arts and the sciences that operating in the two different domains so instantly they polarise by the very nature of their education system and the way that they are set up.*

OA *It depends what your mind is like I mean well on Friday morning we look at a whole load of x-ray and MRI images because that is what we do on Friday morning of all the patients, 25 or so patients have come through the service that week for one reason or another and every once in a while particularly with some of the MRI because they are not necessarily, axle and transverse the ways CT are I mean you see absolutely mind boggling interesting images visually I mean they have no and in fact very often they are just looking at the corona sections through the skin and muscles of the buttock and lower back the bones of the sacrum and they have the most astonishing sort of put them on a T shirt and you would make you would certainly made a fortune in Kate Ashbury in the 1960s they look like all those hippie posters that you never saw but they are appearing*

J They are in a context

OA They are in a completely different context but if you draw that out as I occasionally do draw people attention and they think yeh you are right there that is amazing

J Do you think is true Alistair do you think that is because you have that ability to flick your brain between maybe, I mean this is a gross implication but you are kind of flicking between the left and right side of the brain you are almost seeing it for its aesthetic value.

OA I don't know, I think and I don't know if you have spoken to any surgeon but I mean there is a strong aesthetic that informs a lot of particularly the things you do with your hands in this that people forget about, if you look at the sorts of hobbies that people have often they do do sculpture or they do do water colour painting or something like that as their hobby and that is not because they are completely split when they are at work they are doctors and when they are at play they are water colourists or sculptures in fact there is a, as you would expect there is an actual continuity there and to see a good surgeon at work it is the same visual experience for the person looking at it, if you look at those films of Henry Moore, watching him working on a solid bit of and you see the shape emerging and you can watch a surgeon and you can see exactly the same sort of thing and you think this is, what sort of bloody mess is this the whole thing there and stuff coming out and blood spurting and then the whole thing emerges and there is an anatomical, something bad has been taken away and things left not necessarily as they were but tidy and neat.

J There is a poetics isn't there to it there is something yeh

OA And you have watched somebody do that with their hands and so the world, people would always try to split those worlds because it is convenient we like pigeon hole people and we like to pigeon hole our own activities but I think mentally, I am just thinking about is that's unique to medicine do the other life sciences have this sense of aesthetics

J I think you have, I think the difference for my own personal short exposure to medicine that I have had in the last three years is the thing I've found and obviously working with the life sciences as well which tend to kind of bench based rather than interaction with patients there is inability to reach out that the clinicians have because front of office almost front, they are the ones that are having to deliver this stuff and deal with real people and deal with real issues and not just the mechanics of the issue the mechanics of the problem it is also psychological and human beings are human beings they don't always, there is more in some other parts you would like so I think clinicians see that more than somebody maybe in the life sciences who is locked away next to Phil Cohen and beavering away trying to find some compound but working with images, I mean when somebody you know like yourself or Graham Houston who is constantly having to interact with human beings and that sense and deliver information and complex diagnosis and I don't know whether that makes you more holistic or makes you more arts space I don't know but it certainly, you don't discount it I don't think

OA No and as I say, I think a lot of the people I work with have a very strong visual sense, I think that is just not to do with and it is not just to with imaging there is this whole thing about pattern recognition a lot of diagnosis non radiologically based on not an image based diagnosis is about patterns the build of the patient the way they hold their head, the colour of the white of their eyes you do these things sometimes at the end of the day

J You just get a gut feeling almost?

OA Exactly then you spend the next two weeks and three thousand pounds proving what your original supposition was but you can't just think well they looked like they had it.

J It is interesting though that is a really actually interesting point that you are making there because I was handed a paper about 6 months ago it was published Australia and it showed that patients with kind of chronic angina and heart problems and they were in the process of recovering and the clinicians were getting them to draw how they felt about their heart and they were scaling and they had some sort of measurement that they were gaining from the drawings it wasn't all kind of just draw what you want there was some sort of guidelines to get them to focus their attention on how they feel and what they found was that the drawing over time outstripped the diagnostic or capabilities that that CT was providing so in a sense the drawing was much a better gauge of their reality of the start of their heart function than actually a very expensive CT but again I think a lot of it was only pilot work so I don't know if you can really carry much weight to that, but it is interesting because this notion that gut feeling is less valuable than having empirical evidence it is almost like that is what the science thing is based on, you need some evidence to day that you can't really go with your gut feeling but you should if you are an experienced professional have a degree of that shouldn't you

OA There is a paper and I can't get the exact title of it right but it was addressing this issue it was in the New England Journal about 10, 15 years ago and it is something about the whole of scientific medicine was less than what a good clinician knows

J That is interesting

OA That is not, it was better put than that, but that was the concept that there was all that science stuff but there was also some sort of added value that came with instinct, experience, the thing I suppose that artists do which is taking a variety of sensory inputs and converting them into a coherent hole which is, what in particular diagnosis in medicine is about and the attention to abstract detail that seems completely bizarre to an outside observer but actually clinches it, there is a story about a Dundee clinician, the details of which I won't go into but basically a young woman was extremely, was admitted sort of morodont as an emergency this was 20, 30 years ago and saw a variety of doctors from a variety of different specialities and all they could say this woman is really really ill and we don't know what is wrong with her and we don't know what to do and she is fading away before our eyes and this guy was one of the physicians on call and was brought into see her and he sort of looked at the scene and he just went and looked between her big toe and the toe next to it and said 'this woman has had a back street abortion and she is septic' and he was absolutely right and what he had seen was a little bit of

caked blood between the two toes I mean it is Sherlock Holmes stuff and so she had been, had this body procedure done with infected instruments, had come home showered and washed as best you could but missed that bit that we all miss that we nag our kids about and that was the clue but if you watched man going up to a very very sick young woman and looking between her toes

J Having that level of experience

OA That is where you science and things don't particularly help and that is a kind of almost cartoon version of what I'm trying to talk about. Sorry we are off images, are you not supposed to keep me to the topic.

J No it is okay, I will try to but I was mesmerised there, basically this is the last set of images anyway.

OA You allow waffle time in this do you?

J Well it is dialogue isn't there is no, I mean some of these there probably might be 90% of it is just waffle but there may be hidden gems in that when I play it back so I think it is really important that you just, I think what is interesting about imagery it causes these sorts of emotions to bubble up and having both things and using this as a mechanism to discuss, the artefact is doing what it should be doing

OA Yes it is getting the tribe discussing things.

J And it is really funny that you should say that because that is exactly what we have got out of the patient study that patients are less inhibited and want to ask questions now they feel they have some, even just basic knowledge

OA That is fascinating

J So in a sense me building images that are heavy aestheticised and might be quite distant from the scan is probably neither here nor there we are actually finding that the patients that we have interviewed so far are actually less inhibited about talking about what they want and also this stereotype of the baby boomers or the 60s patients with renal artery stenosis tend to be kind of slightly older and the psychologists said you are going to overwhelm them with stuff here this is too rich but what we found was the opposite they actually wanted interactively they want the DVD they can slow down and speed up and they also want the health professional there they want to ask the health professional questions the same way as the doctor, I would really want to ask him a question now, so this notion I think, lets get back on track and we can talk about that after, of getting the tribe together is a nice way of putting it, it is getting people to talk, I don't know you can put the boot in with medicine and say medicine is not really good at getting patients to talk and all that and I can't really, I have got that with no foundation because I've only spent the last two years, it is not really a long time but I think these sorts of things help. Anyway getting back to this, the image straight ahead of you here it is a cross section of the heart cycle basically and it was taken from MR done in Perth and it is one slice over time but it is actually, it is an interpretation because the heart moves so quickly the MR can't keep up so they take across ten or twelve heart beats and they piece it together to make

one sequence, so on a sense it looks real and it has a degree of authenticity but in actual fact, so the minute is an average it is a mean

OA *It is like a recording, it is like a piece of music where you splice the best bits from take one to take two*

J *Exactly it is almost like the highlights of the heart beat and the image on the left it differs from all the rest because what it is it is a combination of different pieces of data it is not one specific patient and it is not specific piece of information it is if we let it just roll again the vessel is taken from the stenosis, this tube is taken from the stenosis with a degree of transparency the red blood cells are not taken from any data they have just been animated by me and they have been animated and exaggerated from eye balling this and spending time with the patients that come through radiology, sorry looking at their kind of scan data and getting a feel and spending time with Graham and some of the vascular surgeons to get a fell for how this moves and how we might describe it so it is not a translation in the sense of taking one piece of data and moving it into another there is some degree of interpretation it is actually the old school way of eye balling something, getting a feel for it and then reproducing it in a way that people can digest and the red blood cells are falling into the same category that they are Smarties they are stylised, idealised red blood cells but what they are doing is maybe just giving some insight into the particular movement of red bloods cells as they move through and not reflecting any sense of reality and how many there are, because if it was reality it would just be a solid liquid sort of spiralling though so you won't get, it wouldn't be penetrable and so it does fit with what you have said this process of triangulation, so maybe I could ask you to comment on how these images compare and their degrees of visual qualities and integrities.*

OA *It is interesting now that you have told me how that MRI ??? this is not the sort of MRI I would ever look at professionally I am, this is probably of all the images you have shown me on the right hand screen that is the one that I would be most unfamiliar and what strikes me about it is how very un, although it moves how very un-biological and very un-physiological it is I mean this sort of discontinuous movement it is like watching the provenance of the sequence is the clue there but it is like watching an old silent movie with that sort of jerky freeze frame action whereas again if you have seen a beating heart you know it is not, it is an all together smoother and less jaggedly thing and so in a sense I suppose, it sounds funny to say it but in a sense I am irritated by that because this is the imager where I'm sort of, because of my unfamiliarity with it in my daily work and this is something that I'm not looking for pathology because I wouldn't know where to look and I have no idea what a disconetic ventricle would look like on an MRI unless it looks like that and the thing that I'm complaining about is in fact the pathology, it might be the case I suppose, em so it is the lack of joined upness of the movement as I say is irritating me but I can see if you were wanting to diagnose something, that that could actually be an advantage I suppose to a disadvantage because of that sort of freeze, slightly freeze frame you get longer to look and a moment to think about it as you are looking at it as you go along, I mean again this is just the iconography reflecting that fact that I am a ??? and this is the incredible voyage and I can't remember who was in it now*

J *Rachel Welsh and Donald Pleasance*

OA *That is right he was the scientist wasn't he, he was a sort of baddie*

J *He is always the baddie isn't he*

OA *Yes and so like a scene like that I'm looking for the submarine, but I mean that is just garbage I bring with me but what I like about these images compared to that is that there is, the push of the heart and then there is ??? levers and there is a lovely sense of drift on the movement and then particularly again in this short where you have things coming away from you and towards you there is that wonderful pulsifile sense and it has to do, these images flow, that image doesn't, I suppose what I'm not having a sense of here is actually the fact that the containing vessels also pulsate because if they didn't how would we ever take the pulse so its kind of funny seeing them constrained within again this sort of plastic blood vessel, when I sort of know both intellectually and I suppose emotionally if you like that blood vessels themselves expand and contract with the flow of blood and with the movements of the heart and so it is almost like watching blood flow through a dead person, which doesn't happen so there is a suspension of disbelief involved in that but the actual motion, possibly with the exception of this sequence here which I say has a fantastic that is probably the least convincing, except it may be gives you just the same sort of, it anchors you before you come to these, the more I look at it the more I see the clumping at the biofication there, you can see why that would be a very classic where there is damage to the lining of the*

J *Oh really*

OA *Yeh when you get arterial disease the damage is classically at the biofications and it is that biofications presumably because of repeated trauma, and you actually have a sense of that, the byfication, there see how it is clumping, I don't know if you knew that, you see how these sort of clump there and then go left or right*

J *That is just more of a side effect from the film, it is animation but I never actually probably too real than me*

OA *Well , but that exactly proves my point about what you bring to it whether you are talking about the Incredible Voyage or the fact that you happen to know that endoflio damage is more likely at biofications than it is on the wall of a straight tube*

J *It is interesting just through just through that visual bringing out some of these issues even though it isn't that right it has got mistakes it is almost like stimulating parts of your brain to just bring issues to the front*

OA *Absolutely, what this says to me is that the lining of the blood vessels gets a hell of a bashing, seventy times a minute for a lifetime.*

J *It is mad though to think, when I did this and I started this thing when I'm running around doing sport it must be an incredible stress but then obviously it copes with it*

OA *It conditions in these things, and I take no exercise so don't ask me to defend it*

J *So you basically you are conditioning the cell*

OA *Yeh, I mean what you are doing is you are making where the blood is less sticky your heart for any given degree of exercise your heart isn't having to beat quite as much because it is beating more effectively which is why athletes have slow pulse rates so it means that when you really are stressed you have got more reserve capacity and I suspect that the elasticity of your blood vessels which isn't shown on that animation is probably better as well, in fact it almost certainly is.*

J *Interesting, so the last couple of images Alistair I'll put up and then we will maybe just gab a seat, we have covered quite a lot of ground already so some of the stuff probably going over the same things again. These images here are fairly in a sense polar opposites one is an MRI taken from one slice of the aorta and this is the aorta from the inside and maybe just comment on the visual qualities and what insight you feel they offer, positive and negative response just as well.*

OA *You have the ecstatic image there. Its interesting because what it looks like to me, if you told me that's a photograph taken out the nose of a Lancaster bomber over Hamburg in 1942, on one of those moonlight bombing raids, I would have said yeah, sure, you can see the Elbe, you know, and is that the Kiel Canal or whatever, that straight thing that looks non-biological or non-natural, so does it convey intrinsic biological medical meaning to me? No it doesn't, that particular image, as I say it could be anything and if you hadn't told me it was an MRI of the aorta I wouldn't have known and you could have been talking about a ??? and I would have believed you. The still on the left is again, it doesn't, it is kind of like are we in the asteroid belt is this something is this a still from a Star Wars poster, I mean I happen to recognise that that we are looking at biconcave disc so they must be red cells not asteroids but other than that does it feel, I suppose what I'm saying is it doesn't feel particularly biological and what are these soap bubbles doing there and it gives the impression of solarisation on a camera lens or something but if so it would be hexagonal or something ?/ I'm sort of mildly curious about it but*

J *I'm going to put up another image and this is the final image and it is a continuation of that*

OA *That is much more, that is much more biological that has got a sense of give and take in it, it has got, I assume that is actually the renal artery stenosis*

J *Yeh*

OA *I know you are obsessed with it and you get a sense of the tapering but again is it some strange torso but it feels biological I mean ??? in a science fiction sort of way that could be a science fiction image but it is quite definitely a science fiction image of something that ??? and therefore much in a sense much more interesting and I would say much less like a film process and clearly because of from the context I know that you can see the bottleneck and you can see the cells struggling to get through if you like and again I can sort of build my own little narrative about that and interpret it in that way, it is also just rather beautiful I think, the lighting and things, what is that strange body coming down from the top*

J *It could be Saturn*

OA *Yes, although no I mean it is much more like the, again it has got a much more ectoplasmic type of feel to it is doesn't feel like a rock if anything it is an alien looking at a torso or something but it brings life to it that the other images doesn't have and that has got no sense of life to it at all ????*

J *Right great Alistair that is perfect do you want to just grab a seat and we*

OA *Do I have to sit on the electrified seat again?*

J *Yeh this is when I electrify you and if you don't give the right answer then you get more of a shock. Before I ask you these questions I wanted to just give you some insight into how they work, because it is flat produced so you are probably not aware of the some of the processes that I go though to make this stuff but I think it is important to give you some sort of insights before I ask you these questions. I mean in a lot of cases I find it quite hard to feel to see where the art fits into this how can the visualisation process the ?? process but the buffing cushion is only actually a small aspect of it and actually the development is a huge part of it and the interaction with the staff I mean obviously there is ?? groups and anatomy groups but I'm aware these anatomy groups they are someone else's interpretations there is a kind of stylised and these things actually don't exist they way they think they are almost schematic most of them are schematic so the dynamics is a starting point. I find it quite useful though just to educate myself and that is quite interesting as I've had to gain some sort of knowledge to be able to converse it into the images but also there is a historical question I'm not the first person and I won't be the last person to build image and it is interesting this is one of the kind of first published an anatomy of books by ???*

OA *And then the figures are all located in the ??*

J *Exactly like a grotto and you have got these theatrical poses*

OA *??*

J *Exactly and I kind of find that fascinating it is almost like the image is trying to convey lots of other things not just anatomy, did you go to the exhibition in Edinburgh?*

OA *I think it has just come to here.*

J *It has*

OA *The opening night was on Monday, is that right?*

J *Yeh*

OA *And then I forgot about it I was actually in St Andrews*

J *It is between the two institutions*

OA *Exactly and I was actually in St Andrews and then as I was driving back I realised that was where I was meant to be but then I had to do something*

else and I can't remember what is was now but yes, and that was the exhibition.

J *It is a really good book and there is lots of essay and short stories and poems to match the imagery*

OA *Wonderful*

J *And it is both contemporary and historical so it is a real insight, I mean it is very much from the humanities approach but equally it is interesting for me because it gives some. So that obviously adds the historical bits and we also have historical aspects that a lot of the stuff I do has a degree of illumination and light and that doesn't just come it is not just invented and a lot of the influences I have put in*

OA *Joseph Rice of Derby, do you know that one?*

J *No*

OA *Because that is science you see it is called the 'experiment with the bird in an air cage' and it is an illustration of a scientific experiment in which all these people, I mean it is like the anatomy one and a lot of his painting as like that so it is lit from the centre and the centre is where the experiment is going on and the light of the experiment is shining on the faces of all the people looking so it is a visual metaphor for the light*

J *Yeh the illumination of the experiment*

OA *Yeh it is illuminated and it is fairly*

J *Well this is, in some ways*

OA *??*

J *Yeh Caravaggio and this is obviously exploring some of the Vermeer's there is an incredible amount of sophistication in optics and how he dealt with optics using very kind of traditional media and that has influenced a lot of work that I have produced*

OA *I hadn't made that connection but*

J *Because obviously if I didn't if the lighting was fairly kind of basic you would end up with something like this a fairly diagnostic, if you give humanity to the work it is often the lighting that provides it and I mean that would probably be a fairly benign image a girl at the window, I mean this is the one that inspired Frank Gerrie, you know this is the one*

OA *Yeh the painting on the roof*

J *You know your photo upstairs you sit next to Frank Gerrie*

OA *Is that right*

J *Yeh I'll show you*

OA *My one claim to fame*

J *You are sitting next to him same with somebody else. So anyway there is almost like there is a degree of analogue input and there is also the interaction with staff we have lots of meetings and chance encounters, the emails that go on to and fro and the drawings getting staff to draw what they want to convey and this kind of soup and a little bit Boyzone but this kind of exploration in space had a kind of heavy influence on the work from the beginning although I'm trying to move away from that now but this kind of exploration looking through and also you mentioned it earlier actually this sort of parallels between the real world and the internal world, structures*

OA *Well I mean yeh that is really interesting Darcy Thomson is the Chair at St Andrews and*

J *Yeh and some if his stuff is up in the*

OA *There is a museum in St Andrews*

J *Oh right okay*

OA *All his collection is there, all his ?? shells of maths*

J *It is like the Femanachie series isn't it*

OA *That is right it is all worked out there in a sort of hand and they open it once a year but if you ever want to go there just let me know and I will*

J *Oh wow*

OA *I love to go and see it I mean I like to go and visit these image as I used to browse it as a medical student but the dean of medicine is one of my best friends*

J *Oh brilliant*

OA *And you can just go in there at any time*

J *I would love to see that actually that would be really interesting I mean a lot of that fascinates me this kind of golden section as description but it is funny that was an age when poetics had a place it was almost like, I was saying this to somebody else and somebody else was talking about this the guys in the trenches used to carry books of poetry and*

OA *And they weren't writing them*

J *Well exactly and this notion of having something else and I don't know if we have lost that and certainly some of my images are often judged on the fact that do they impart information and sometimes it is not about that and that ?? reductionism if you reduce everything down and down and down*

OA *to think about what I was saying earlier there is, it is possible within medicine to enjoy if you like an aesthetics of everyday life that there is a tactile aesthetic pleasant experience to be got from an operation when well done. A*

rather slick technical solution to a three dimensional well geometrical planning problem which is stuff I do, it is lovely there is an aesthetic to it there is no

J *It is harmless*

OA *And if you then go to the laws of physics and Einstein and people like that they talk about the beauty of the correct solution, there is aesthetic that when you get the right answer then it has an aesthetic quality it recalls it is usually extremely simple and it is that, the most parsimonious solutions and being correct and being aesthetically satisfying and we are all do it*

J *We are all in pursuit of some sort*

OA *But we had to deny it nowadays because if you said well I'm going to do that operation because it is was beautiful and you would say, but in a sense that*

J *That is an interesting one*

OA *I don't know how many surgeon you have spoken to but I mean*

J *I mean surgery is quite a tactile process isn't it?*

OA *It is*

J *It is texture, form, shape and they kind of feel their way through the body don't they really*

OA *Yeh*

J *I don't know, I mean I have not really dealt with it but I know I have met Paul a through times*

OA *I mean he is very interesting you talk about art the whole time and if you want*

J *Well I think you said if it looks good and it is good, I mean I went to one of his lectures he gave once and it was one of these cross faculty things and it was all these ripply stitches sort of pulled to the side and symmetry of some colrectal procedure and it was really morbid looking*

OA *If you, that is the other thing we talk about aesthetics you actually have to think well this isn't a pipe through which faeces is travelling on a regular basis but you have to take that bit out but once you are used to it, you don't think of that, that people might find that is*

J *One other thing Alistair that I want to show you is and I'll ask you these last few questions which is this notion of building work from scratch, this is something that I've been working on recently and just building a kind of anatomy but just purely based on my observation level, I mean it is a bit like the anatomists in these kind of books that we use, looking and then creating rather than forming from pure data which I did before and it is all this, and I mean they both kind of work together*

OA *Oh is that from exact data?*

J *No that is me, so that has been sculpted just completely from scratch and I've started to add to movement and*

OA *I tell you what stuck me and is interesting but what, I suppose if I had a criticism it is that I don't have a sense of the heart squeezing and as if the heart beating*

J *It is that ??*

OA *Exactly, the exact thing that it squirts the blood*

J *Well that is how I see it*

OA *It is very different*

J *Well it is and that is why it is on this screen I've not produced it in an experiment and I'm still trying to comes to terms with this, it is not that difficult to animate but it is difficult to make it believable and you have to add other visual clues in on this data, aesthetic things like taking a few different camera angles and it is, and also this is all static, I mean in the body this would all be moving and obviously I have chopped all the pipes off so instantly you have already got a stylised image*

OA *???*

J *Yeh I know I have ???*

OA *It is difficult to know where to stop isn't it.*

J *I mean is it all my work and it opens a can of worms but*

OA *That is the thing*

J *Yeh, well that was an image I took, that was in the Museum of Natural History in New York and I just took that because I liked that but it was sitting on my work station when I was beavering away and it really helped pick that image out, it really helped me develop that and that was what inspired that and I think that screen doesn't do it quite justice, a lot of these images are quite kind of subtle and sophisticated and you get these projectives are just not up to the quality with these sorts of screens it is just kind of minimal you have to print stuff to really get a feel, unless you have got an HD TV*

OA *Really just an aspect.*

J *Well I can build stuff in a HD TV but nobody has got any HDTV in this place*

OA *Really*

J *I think they have got any in the school here, I think they have got one plasma screen here in HD TV but they are quite expensive. So that is quite interesting this sort of, idolised sort of notion of what anatomy should be everything else is fine*

OA *Have you talked to any straight anatomists*

J *I had Sue Black in, you know Sue, she is professor of anatomy but she it*

OA *Is she in the St Andrews School, she is not really an anatomist*

J *She is not*

OA *She is ??? I mean there are very few , there are actually very few anatomists ?? it might be a bit simpler at St Andrews, it is fair to say there ??? and that is what we have got and very few people do that, they have other ??*

J *Why is that, is that just because we have moved away, did you go to the Dow lecture by any chance, they had this chap up from Imperial College*

OA *No I didn't go to that*

J *He went on the rant for the fist twenty minutes of his lecture about the medical schools of teaching students to be tree huggers and their understanding of the human body and how they deal with bereavement and*

OA *Exactly, ?? in their life*

J *Exactly*

OA *I mean I'm never quite sure what it is that is actually done whether people ??*

J *It talks about the crypt a lot*

OA *Yeh but in a lot of ways ???*

J *You don't miss anything*

OA *You see that whole thing in ?? crypts there is a whole broken form that I have never actually ?/ structures and factual geometrys and things you look at the ??*

J *I mean it is sort of an aestheticised process society is so aesthetic it is more than most it is almost like it is screaming*

OA *But there are ?? of denialty all the time*

J *Well it is this notion that is not, the cap fits it is a reductionist modelling it is not really, the humanity is obviously been out there*

OA *It is just, it is just on the cusp of ??? in things we actually do, say ease our complex, it is a very interaction it is between the compartments it is not like compartments being self sufficient and until you can embrace an economy of that complexity your understanding of the experience and as you build a whole, the whole is concerned with some ??? but the whole thing is ?? . The people who actually hold the power ???*

J *It is like somebody said, I think it was Paul, grab a seat, Paul had said that he went to a lecture he went down to Coldspring Harbour and he met*

OA *Watson hangs out there*

J *Yeh he met Watson, he went for dinner with Watson, I always get them mixed up, Crick is dead and Watson*

OA *Crick is dead but Watson is still alive.*

J *But he went to a lecture, it wasn't by Watson but someone said that human genome is a bit like cataloguing every postcode in London but not knowing how to get to any of the addresses or how the inner city interacts.*

OA *Or is a poor neighbourhood or a rich neighbourhood like Buckingham Palace is it Stretton and that is it but there was all this great thing, the Book of Life,*

J *Okay these last few questions actually because I think we have totally gone off, first of all what would you define as visual integrity in your own practice Alistair, what would be your*

OA *You see I mean it is not, what is visual integrity*

J *I mean you seem to embrace wholeism in the sense that you are not going to necessarily, you see beauty in things so I suppose integrity*

OA *I suppose, are you talking about visual integrity in general or visual integrity of an image?*

J *Well of an image that*

OA *Okay I mean the visual integrity of an image to me is a quality that is possesses that increases my understanding of the problem as a whole.*

J *Okay*

OA *So whether it, in other words there is a difference between integrity, precision and accuracy*

J *And what would you define, if we are moving out of the bag or you diagnostic hat and you move into more of a general bag where the images are much more kind of judged by Joe Public or even just by patients or in this gallery space what would you think would be the components that make up integrity?*

OA *I think it is almost the same answer, I mean it is an image that enables the person looking at the image to achieve a better understanding of that or those concepts of that object or whatever the image itself represents. So you could go back to old Madonna and Child paintings of the middle ages and say the visual integrity of those images were actually the extent to which it evokes in the viewer a feeling of religious awe and understanding of the nature of sacrifice etc, etc, all those things that go with the Christian religion if you like, that is the extent to which those paintings and images or icons if you like have visual integrity, this is to my no different it is kind if like the extent to which a viewer looks at that and has a sense of kidney.*

J *You have the essence of it?*

OA *Yes*

J *Maybe more, maybe the important essence maybe not but I suppose you are getting in difficult ground when you say does it give the essence of what it means to be human.*

OA *I wouldn't go as far as that although, because I think that, well it depends what you feel yourself to be about as an artist John, you are the artist here not me.*

J *I move from two domains, I find I constantly have to keep re-evaluating what I'm trying to achieve in the PhD and as an individual with a professional career because I start, I come from a design background initially product design and moved into an area, I came into academia and I was very much from industry so I had this notion of gaining a brief, delivering what a client wants and that started off, I identified a problem which was patient communication and used my skill set as a 3D type visualiser, animator, whatever you want to call it to then solve some of those communication problems but what as I developed and sort of became quite clear and I got a bit more automated to develop my own sort of stuff it became clear that there was a much broader context to the work and it wasn't just about solving a brief and serving a patron it was almost like John you can create, your images actually stand alone and never mind creating for a patron they have like value on their own right and they come from you even though your patron might provide you with some support, there is an argument to say that you could have achieved that quality of image without, you just converted your skill set, developed images for patients but some of these kidney images is a good one, maybe the veritable arteries is another one they stand alone in sculptural forms they could be sitting in this room, they could maybe sit on the Turbine Hall the size of a double decker bus in Tate Modern and be judged as just beautiful pieces of sculptural forms.*

OA *I mean I haven't seen it yet but I'm desperate to see it, there is this installation of slides at Tate Modern*

J *Yeh Karston, what is his name*

OA *If you could turn your vertrebal arteries into a slide so that you can acutely slide down the arteries wouldn't that give people a sense of the nature of blood flow.*

J *It is funny because you kind of shattered one of my illusions which was there was a lot of premise to the work, not illusions but this whole notion of fragility and this thing that we are really kind of tight formation of cells and anatomy that balance on this knife edge and we have got a degree of flexibility but things break, they do break.*

OA *I mean don't get me wrong, but I suppose it is seeing them looking so solid and knowing that an artery is tough but as soon as you start looking and talking about anuerisms and I suppose coming back to your anuerism images what I don't have is a sense on there is that wall is paper thin and that wall is subjected to enormous pressure and that wall could pop at any time and that is fragility, the vertrebal arteries as columns almost again knowing that the arterial wall was thick because it has to withstand pressure of 200 mm of mercury, okay not sustained but there is elasticity there and it is tough, there is less of a sense of fragility there and if you are wanting to bring the fragility*

aspect across then to some extent you may need to rethink about how you do those images, you have got to get

J *I mean that image of the kidney that was kind of dead and fairly kind of inert was supposed to be this kind of almost like porcelain type feel that you could have a room filled with lots of kidney and different orientations to have a feeling of almost like, it has this, I mean porcelain is very strong in one way but also very fragile in another*

OA *Because porcelain and kidneys are connected in another sense aren't they?*

J *Why is that?*

OA *Well because most urinals are made of porcelain, as Marcel du Shon would have pointed out to you.*

J *That is right yeh, good point never thought of that*

OA *A good visual joke there*

J *That brings me on to my last question which is what role do you feel an artist should play when working with medical scan data?*

OA *Oh well, I mean you know what I'm going to answer, I think they should do exactly as they are told my their masters and patrons John (laughs). Well I see*

J *I think it is more*

OA *I mean what you have the, you have two unique things going for you, firstly you are a lay person so you don't bring all the baggage that I bring to all that cross section, I'm looking for pathology and it is what I do so you are a lay person and so you have no preconceptions but not only are you a lay person with no preconceptions but you are a person with a skills side that is informed by an aesthetic and the skills set you have acquired yourself by what you have been told by a variety of people and you aesthetic is you, so yes in one sense you can interpret the world of medicine for other lay people and that is a huge kind of useful thing and that is kind of like if I remember the brief for your PhD it might have just as read almost as simple as that, in imaging terms, but also that presupposes that we have nothing to learn and that is not true we, as I was saying earlier there is absolutely no antithesis between a well developed aesthetic sense and practising good clinical medicine and old fashioned people like me from a liberal arts background which is where I was in before I went to medical school would say that not only was it, it was essential and that hitting back if we liked to the Nick Wrights of this world you use that at your peril and for every tree hugger who may be barking in medical school if we allow the people to develop as human beings there will be 40 medical students who turn into doctors who will know how to relate to people and how to listen to people and that is not something that is necessarily, if you set out to be a pathologist and that is probably not something that you are going to be terribly interested in*

J *But it is the somehow*

OA So it is this two way communication, in other words it is not just about educating the patient where their spleen is and how big it is and what it looks like when it is diseased it is actually about making us rethink some of our assumptions and also if you like put us back in touch with the sheer beauty and cleverness of the human body and coming back to that you are talking about that sense of fragility I mean maybe one of the things, whereas as I would seem to emphasise robustness, you see part of that comes from the fact that bearing in mind the stresses strains to which as a species we have been put over the millennia and which as individuals we are put over a lifetime it is amazing I mean our flexibility and durability is extraordinary.

J Yeh we are very adaptable as a species aren't we?

OA The guy who appears on television and crashes his jet car at 300 miles an hour and comes out of that, now how does the brain cope with those sorts of g-forces I mean the sort of g-forces in fact that astronauts deal with, the fact is we do and this is a computer we are talking about if you like but is

J Neurological one any way

OA Yeh and so there is all of that as well but you are absolutely right in a sense the skull is an eggshell and material within it can spill out as anybody who has been in a car crash can tell you so we have this strange paradoxical robustness coexisting with a fragility if you like,

J Yeh, I suppose it is maybe a kind of Scottish, I don't know if it is a cultural way the way I look at it that I just see so many people abusing their body in the sense that we are a very unhealthy country people don't really and I think I peer into these structures, I mean you provide me with instrumentation's as a looking glass to look I mean I was just auditing how much, I mean I have only been working with four or five pieces of data across the whole PhD ask how many scans they do in radiology in a morning and I've done that three or four year I've been spending time looking and looking and looking and again and again and again to find beauty in them

OA But that is the untapped richness and that is the stuff we take for granted but actually maybe we shouldn't be taking it for granted to quite the same extent and that there are these fairly important messages that can be teased out as you are teasing them out of me just now almost.

J What I would love to do is to make or produce an illustrated book of all these images and create a short small kind of fly through of the body and from a different way and not then a kind of Horizon, the cliched sort of contracted Soho animation company to produce something

OA No that is where your aesthetic comes in that is the point I'm talking about earlier it is not just as you put it, delivering a product for a client it is where you say lets take this a little differently lets, it is not just about explaining the inside of people's bodies to people it is also about making aesthetics statements about if you like the human condition, the meaning of life if you like

J But those issues that you describe artists feel free to talk about and they will talk about what it means to be human and they will trade in that language but what they are really scared of and what is constant and what I find really

frustrating is you will find very few people in the humanities and practising artists will say the word beauty they will talk about, beauty is now seen as a some sort of passé some sort of historical artefact we can't apply to work now, beauty is not a, that is changing it is changing particularly artists like me that work in contemporary media and I've got things to say and I'm quite happy to wield that kind of beauty care and I have no problems with that and it is not a naiveté it is

OA *You were asking me about integrity before and okay integrity is truth and Keates said, 'truth is beauty, beauty is truth that is all you know and ever need to know' and of course what was Keates professional background*

J *He was a medic*

OA *Yeh, so that idea that you should be unashamed to use the word beauty in the same sentence as truth or integrity it seems to be the modern word goes back 150 years, so that is fine I don't have any problems with beauty, I think the only problems with the word beauty nowadays is things like, because of the way it was used in the 50s it became a slightly, it became part of the vocabulary of the gender awards if you like because we had things called contests in which women paraded in bathing suits and men judged them, there was a sort of, the word almost became politically suspect because of that connotation, but that is nonsense that is like saying you shouldn't like Albret Dureaus drawing and etchings because Hitler was a German too, it is just ridiculous.*

J *It is funny that I get a, especially from the theorists actually, there is a theorist coming in neck but you get his real kind of negative vibe back when I use the word integrity to them it is like using the word cancer it is so general, to them it is meaningless, it has to have, you have to give it some sort of a context and locality to then navigate through it, it is interesting, well Alistair maybe we will call it a day there because I've got*

OA *I've got two hours parking as well, so, it took me ages to get parked that is why I was slightly late actually.*

2.22. Designer D

Interview with Designer D
Date: 25/10/06
Time: 16:00
Duration: 00:55:16

J So basically the images are split into two half the projections are in two halves and the idea is I want to bring up some scan data or images that are produced from the medical or scientific instrumentation and then bring up some of the 3D reconstructions that I've been producing as a result of that and then give you some insight or gain some insight from you on how you navigate through those images and I've got specific questions I would like to ask but what I will do is I will give some context I will explain what you are looking at so you have some feel for the background to these images and some of the questions may seem totally ambiguous

DD But that is deliberate

J It is deliberate to an extent and if you want to gain clarification that is good and that is fine so don't worry if you want me to do that, that is absolutely fine too. So what I'm going to do is I'm going to bring up two arterial images here, now straight ahead of you these are images taken from an MRI scanner

DD What does MRI stand for again?

J Magnetic resonance imaging and what basically happens is you get put on a table

DD And you go through this core

J Exactly and you sit in this core for about thirty to forty minutes and they run a series of sequences which effectively analyse your body in various compounds that make up your tissues and then the machine converts that through mathematical algorithms into images, into grey scale values basically and in this case they are looking at the vessel structure so the areas that are bright white is the areas of blood flow, blood taking oxygen to the brain and these are cross sectional slices, so this is one moment in time and the cross sectional slices are going back and forward through the head and neck

DD Right so they are like payers?

J Yeh but obviously like layers going down the way rather than layers going, so there is almost like going from your nose to you back and it comes back again, just scrolling back and forward. The image on the left is different in some ways but the same in others it is a visual reconstruction of that data so the shape and the geometry of that structure has been developed from the areas that are glowing bright white in that image so in some ways there is a translation process but there is also an interpretation process, texture,

colour, lighting have been added and the camera angles and pans have been added to give a feeling of structure and form of the shape and this about a ten second loop that takes you through and gives you some insight, so I will maybe leave these up for a few more seconds, I'm not going to take them away but I'll just let them play and I won't speak. So the first questions that I wanted to ask was please describe in your own words what insight you feel each of these images provide into the human body and then the second question is linked, how would you describe the visual qualities of each one of these images? and you can make comparisons or you can navigate through one then move to the other it is entirely up to yourself

DD *Well the first obvious thing is that, that gives you an immediate three dimensional perspective on things whereas that gives you much more abstracted representation, abstracted form of representation, you could immediately assess that is something three dimensional that could quite happily fit inside your rib cage and your brains and you can actually physically map the body onto that whereas there, in a way the body shape is much more obvious you can see what you are looking at but if you didn't have that you wouldn't know what that was so it is very important that you have both because otherwise you would be lost, that could be anywhere, the scale of that would be impossible to understand, it could be a tiny thing inside your toe but because you have it in context it is very easy to make sense of that so that is important, they very much inter connect, from that for me it would be extremely difficult to reconstruct from the black and white the series of images, it would be very difficult to reconstruct in my head some sort of three dimensional projection, it would be complete guess work but seeing the two together I would understand that that could be quite logically the result of interpreting and extrapolating that, so is that really answering your question? Yeh can you ask the question again or do you want more detail*

J *I mean you covered a lot of that in some ways, I mean obviously my question involving what insight do these images offer and then what visual qualities each one of them has and you maybe give some insight to that*

DD *In a way they are both misrepresentations because probably the colours, I don't know, is that what arteries look like*

J *Well to an extent, there is a high degree of interpretation*

DD *And also your lighting that in a quite dramatic way but adds an emotional quality that actually perhaps shouldn't be there in a way.*

J *I've got a question that is a continuation from this, I mean it is a question that will sound fairly ambiguous but I will follow it up with some detail, do you feel that the interpreted image, the image on the left, the three dimensional image has a lesser a degree of integrity due to its abstraction, abstraction is maybe not the right word but its degree of interpretation because obviously and I will define what I mean by integrity and authenticity but in some ways the image straight ahead is an image that can provide a diagnostic answer although it may be an interpretation it is firmly embedded in the kind of reductionist approach and mistakes, ambiguity and any form of lack of clarity are what they fight against, they try to irradiate so they can make and build and reproducible mode that can constantly access to make diagnosis so in a sense it gives a degree of scientific insight which has a degree of truth to it,*

however my image although it is an extraction of that information it has additions to it and it has deletions as well there is deletions of information that has been taken away and in doing so I've told another story, I've told the story I want to be told and in doing so does that affect its integrity or does it just take on a new one?

DD *I think that is a really really interesting questions, I think one would in a sense give that the black and white sequence more authority just because of the fact that this produced on the laboratory conditions it has a certain objectivity about the way the image is presented and represented but what I think what you have done is actually extracted what is the most essential bit of that and then given that more prominence, now in that process as you say yourself there is a translation and so to me that has just as much integrity really, just in a different way.*

J *Do you think the context has a relationship to integrity and in some ways the context, obviously that is for diagnosis and this one is for almost like information and insight and that my image would inappropriate to make a diagnosis but equally that would be probably fairly inappropriate there in exposition although it does have ambiguity to it which often seems to be the sort of key areas that gives some validity to fine art pieces but equally it is maybe just by coincidence it has got ambiguity and not by any sort of process of artistic intervention it is just coincidence. Just hold that thought for a minute because I'm throwing quite a lot at you and I'm going to just give some images just to slow the pace of this down a bit and just dwell on a couple of these issues. I mean obviously I'm using these images as artefacts to sort of stimulate discussion, they are acting as go betweens and trying to tease out some of this stuff so I might jump back and forward and show you things, what I wanted to do was show you almost like a collection of images that I have produced and again they are produced, I've taken a freeze frame from that scrolling sequence just to stop things for a minute and I'm going to just pan through five images and then what I'm going to do is top on one and ask you some questions, they are all very similar they are all taken from that kind tortuous vessel structure but they have got I think an additional degree of interpretation, they tell another story that I'm trying to get across here, so I will just take you through these one by one and I will just pause on one of them and then take you to the next one. I'm just going to pause on this next one here and as you can see they have all got a similar theme to them although they are different viewpoints and different depths of field, what I wanted to do was just Hamid is ask you kind of briefly to describe some of the visual qualities of this image and maybe what insight you feel it offers and obviously feel free to make comparisons to the static one or the freeze frame whatever they are or you may want to just talk about the 3D one.*

DD *I suppose you are looking for some sort of more intuitive and more emotional response to this?*

J *Well yeh, I mean if you feel that is appropriate or you feel that is the way you are reacting to it*

DD *It is again this sense of depth that you just don't get from there, and that does look like a slightly, I would associate that with scientific language because it does feel like a slide that you put under a microscope, the black and white image as that I would associate with a much more natural organic*

real life kind of language where you are looking at something that is alive and that has a very strong organic qualities to it, it is something that kind of jumps out at you and it is in a way much more dramatic in what is represents and there is a greater more sense of depth that is not present there, so that is the immediate sort of striking

J *So do you think then it adopts almost like and authenticity and integrity that is more akin to communicate the emotion then or communicate something else that is not just about the structure or is it both*

DD *It is a more holistic way of representing, it is definitely more appealing because it gives a more holistic perspective whereas that is a more analytical perspective that is breaking it down very much an image that you have to engage with your mind whereas with that it is an image that intuitively you embrace much more easily and I'm probably drawn to it more as a visual*

J *I'm going to move onto another set of images that are further down the vascular system so they are moving down the aortic blood flow, onto the kidneys and I just want to ask you some questions again related to this what is the visual quality and insight and I just want to put up a sequence here and again this is a sequence it is called renal angiography and it is a sequence of slices again going backwards and forward in the chest and abdominal areas showing the kidney and the patient is injected with a contrast agent so that the scanner can pick up where these particular body parts are and particularly this central white glowing part that will come up in a second and what this has been used for is in the diagnosis of a condition called renal artery stenosis which is basically a condition that involved the narrowing of the little artery that feeds your kidneys and if I stop it you will see it and you can see that little chink out of the kidney from the right hand side of the tube that feeds the kidney there is a little divot and that is the narrowing, you hear of kind calcification and furring of the arteries*

DD *That little V*

J *That is basically affecting the blood into the kidneys so the kidney on the health side has got to work a lot harder and it has a kind of adverse affect on your heart as well so there is lots of knock on effects from that. This image on the left here is the same it is a reconstruction of the healthy kidney on the left as it pans through and it has been lit fairly dramatically to sort of exaggerate the form and then there is a degree of transparency added to the shader so it will highlight the internal structures of the blip profusions and the structure that kind of filtered the blood as it goes through the kidneys and obviously it has been orientated in a very different way to the image in the start date and maybe ask you just to talk a little bit about the two visual qualities of these images and what insight you feel they offer if any*

DD *Well again it is similar points in the way and I could say that everything that I have said before but I think what is striking about this is perhaps what you have just said this reorientation that kind of throws it a bit, it is like again if I were to see that image that you have done out of context ie say without that, just in purely in a gallery environment I could interpret that in millions of different ways I would still relate to it as something that is obviously biological but I might interpret as an embryo or as some kind of plant shape, some kind of mushroom shape it would definitely belong in the natural world*

but it could be anything, it could be a little, it could be a baby whale

J *It is quite interesting the point you made there actually, I kind of did think about that but giving and offering some degree of space and distance from the original start point and even in a sense not giving any context to the piece often increases a certain degree of artistic integrity because it leaves space for almost like the viewer to interpret it themselves, I think that distance is probably quite a key issues if you are thinking about you are moving images from what the artefact from one context which is a intimate one to one diagnostic or patient communication context to a gallery context the ambiguity and multiple interpretations are vital to give people space to absorb, rather than having, I don't know how you feel about that*

DD *I suppose it all depends on what you want to do, if purely the purpose is to communicate something to like patient who has a certain condition and you want to clarify that condition then it is very important to have the medical frame and background and so on, but if you are trying to put forward that is just in itself beauty for its own sake then yeh it would be better to remove it maybe*

J *Do you think that is a selfish thing to do, do you think that is almost like an indulgent thing to portray to sort of expose the beauty of it and forget it is human anatomy*

DD *It can be but id doesn't have to be it depends on the intention and the integrity of the artist, I mean a lot of artists in the late 80s and 90s about the body and a lot of it is very good art was produced which had a great integrity and some really rubbish, some real crap was produced because the integrity just wasn't there and it was exploitation so it depends, but here because there is this context to it, that is an image of stunning beauty and at the same time there is a kind of horror about it because you know it is somebody's internals and you have reconstructed it from this scanner and you have chosen the healthy kidneys so there is maybe a bit less horror but it kind of reminds me of looking at a sort of cancer, fantastic images of like cells and then you look at in art galleries and then you would caption as like 'cancer cell' then there is this sort of horror that comes in*

J *I suppose there is an ethical issue there isn't there, there is a responsibility that the artist has when they work in these sorts of domains and it is very difficult from other domains, it is very emotionally loaded, it is very sensitive and you have a responsibility for maybe transparency and responsibility and maybe a degree of honesty in a sense, it might not go for all aspects of the work and the way you present it, its a difficult one isn't it, its quite complex*

DD *I think it is all to do with what are you trying to do as an artist, are you a visualiser, are you a communicator, of course all artists are in a way communicators but what is it trying to communicate, what sort of point are you trying to make, so maybe elaborating on medical data and exposing that and illustrating it or are you trying to make a wider point about this, I don't know, the duty of the*

J *I think I've moved into the latter really quite recently with the newer work and I'll bring up another image as it takes me quite nicely into this next image and this is the same piece of data that has been reinterpreted*

DD Just as a matter of interest why did you not model the faulty kidney?

J Well that is a very good question and in this case I got the most integrity and structure from the healthy kidney because the healthy kidney was the most efficient at taking up the contrast agent so it was the one you could gain the most insight into the structure and gain the most beauty, the kidney on the right on the other hand obviously didn't take up as much contrast as there was a blockage which meant that you get this kind of scraggy not quite formed structure and almost like fairly pitted and not even in a sense real but not real and in some ways it didn't give me, at that point I was interested in communicating insight and communicating

DD Translating data

J Well translating data in one sense but almost like I was in awe I was getting this looking glass into this area and I was in awe of these structures and I wanted to communicate them, it was a kind of rapid turn around of work that was a continuous output there was images being output every couple of weeks where now I'm much slower at outputting work and at that point it was almost like fairly hectic and manic and I was interested in the beauty and structure and not really interested in illness communication and it is almost like the illness side was the boring side, okay I'll do the illness bit that is just to communicate with the patients but the really interesting pictures that I have developed for this sort of like peer recognition and interacting with the arts community was the really nice structural ones and it was almost like showing illness was almost like the illustrative aspect of the work and I didn't really want to show that in sequence to patients and it was that kind of conflict and it still continues in the work and it is still and relates again to purpose and context, what am I trying to do, what are the goals, what are the audience, where is it being presented and that really dictates

DD So it is interesting that it throws up questions for yourself for you as where about is my role in this, where do I stand and what am I really doing and am I, and it is interesting it asks you these questions, it this exploitative, is this helpful is this a service to humanity or is it a selfish thing

J Or are you just serving a patron are you selling what they want to sell to the patient are you just a cogent for their extensions of their communications portfolio and this is definitely not what I want to do and that is almost I started out with that kind of in mind and I felt great but I was getting, people were supplying me with equipment and support and I was rapidly out pushing work which is always great if you are an artist as you are kind of secure in producing stuff and there is a PhD as well on the way, in the pipeline but as you mature and as I mature in the work it became clear that that wasn't what I wanted to do that served me no purpose, it may have provided them with a lot of images and provided a communication mechanism between them and the patients but I thought I owed the patients more than that in some ways and owe myself more than that I wanted to tell other stories, like you have said what is it you are trying to say and partly those tortuous structure of the vertebral arteries again it was all about communicating the fragility and almost like this notion of that we are not invincible we have these constantly, these structures that are constantly under attack and threat by the way we live our lives and what we do and that was

DD And amazingly we are constantly being regenerated as well

J Yeh and actually interesting the clinic, to the clinicians actually see something very different they say I would see the body as really robust and I wouldn't say that, one of the surgeons who was in today said I've held an artery it doesn't feel fragile to me it feels fairly elastic and has gristle on it and it is almost like when you cut a chicken and you are pulling out all the giblets and in some ways that is not the story I'm trying to tell, so there is all these different notions of that the body is to some people and I mean moving onto this one, the visual qualities of this one was more kind of, revolved round this notion of fragility and this notion of almost like preciousness and it gave no insight into the internal structures and the visual qualities offers no insight into probably what the kidney does and offer no insight into it structure internally but I was just really interested in this kind of feel of on the outside and it was a very different lighting technique, the lighting I was interested in was much more subtle

DD It is almost like a still life painting of how people used to paint still lives and tableau's and you would have a skull or something

J The lighting, I mean the inspiration of that was looking at some of the work of Vermeer that was where all that came from, that kind of really subtle ability to manipulate material and use illumination in a way that I don't think anyone has ever kind of, especially in contemporary media like computer graphics coming close to the quality and the soul that Vermeer's work has, a soul as well, I mean you could argue technicians could achieve the way the light bounces around the room with Vermeer achieved but certainly not the soul, so maybe I could get you to comment a bit more on the visual qualities of this and the what integrities it has based on what we have just discussed or have we sort of covered it

DD We have sort of covered it, still life painting Vermeer, yes the Dutch realists it s definitely what comes to mind and it is again interesting if it didn't have a context, if you didn't know it was derived from medical data of kidneys it could again be a really fantastic, it could almost be like a ?? of a landscape a surrealist object that you can get completely lost it, you can wander in and should I climb up that tunnel or should I go inside it and there is a womb like quality to it in terms of something coming out of a womb or is it a cave, it is a tunnel is it kind of mysterious and it draws me in, because of the way you have lit it as it is this real strong dynamic which the kind of light and the dark and the strong contrasts and the very neutral backgrounds really focuses you in on that sculpture that piece of sculpture as there is no distractions one might say that is realist painting where there is lots going on there is endless detail so that the scanner will show, is that enough of a criticism

J No it is all good actually, it is all really good. I'm going to just move onto the second last set of images which is looking at a condition called an anuerism, now this is a set of CT data, CT uses x-rays to take slices through the body and this is going through the abdomen and going down into the pelvic area

DD Yet again a human being in plan

J Yeh in cross section yeh

DD So it cuts like that,

J *Exactly and this is basically this image was used in the diagnosis of a condition called abdominal aortic anuerism which is a bulging that happens at the bottom of the bifurcation at the bottom of the aorta*

DD *Wow*

J *So this image here is the most basic reconstruction that I can do, there is very little augmentation for this image, it is very kind of close, it is the closest that I can achieve to this scan without changing it significantly, it has even inherited a lot of the anomalies or the artefacts from that original data and it is an orthographic projection straight ahead and I just maybe want you to comment a little bit on*

DD *So this is not a three dimensional image?*

J *It is three dimensional but it is one snap shot taken straight ahead with no perspective but it has some basic shading to you get the differentiation between the aorta and the skeleton but that is about it really*

DD *So you want me to again give some commentary?*

J *Yeh just you are navigating through, maybe this image means nothing to you and in some ways it is fairly abstract I don't know*

DD *In a way that is again having that makes me interpret having your projection or your model makes me interpret that with much more clarity, I can really understand what is going on there with scanning through t the bones you are scanning through the artery and suddenly it gets bigger and bigger and then it reduced again and it splits into two so I can understand exactly what those blobs there mean because you have given me a very clear navigational map so they work, conjunct very well, it is funny because you put a grid on there it makes me all it a map*

J *It has got the cartography*

DD *Yes I was wondering where the little compass was*

J *Yes turn left at the GPS navigation point, it is funny that you think in terms of integrity how do you place these images*

DD *The colours are a bit strange on that, it makes me think something odd about these colours I think the brownish the reddish brown you have chosen there is a bit strange and that makes me wonder, it is a bit puzzling the colours they don't quite work for me and it makes me think oh what is he trying to do here*

J *I mean in some ways this is actually, brings out an interesting point because this image here is again an x-ray image or a CT image taken from the MRI but it highlights this thing called this artefact and the fact that that is an interpretation as well as there is actually like phantoms that get added to this that don't exists, they are not real they are just doe to the way the x-ray has passed through the material and the react in a certain way so this pitting that you get on the 3D isn't actually, it doesn't exist*

DD The pitting on the bones

J Yeh the bones, the pelvis, but actually the pitting on the aorta as well is almost like what is happening is they call it calcification that these white flares on the inside of that tube are like hardening inside the arteries they are like calcification and then the x-rays hit them they kind of bounce in all directions and create this almost like flaring effect and so when I went to build the 3D you get this sort of almost like this impression effect as that is almost like a cast of the inside of that vessel so in a sense they are both interpretations and almost like the interpretive aspects of this get translated to that because I haven't smoothed it out, I would smooth them off normally and get rid of those little anomalies to tell the story

DD But you have left them on here for more detail

J I'm going to move onto some moving images to get your thoughts on

DD It is interesting to see the spine there as well and how all the different bones are quite twisted

J Yeh it is interesting and you know why that happens, it is interesting to watch the medics navigate through this because they look at the CT and then they look at this and they can actually tell you things like, this is probably from a male, because it is quite far down you can tell by the anatomy from the CT scan that there is no kind of reproductive organs that are not there that should be there in a female so it is obviously a male, the state of the spine would also would suggest that it is probably en elderly person because the spine becomes distorted because of the compression of the cartilage between the vertebrate and they can probably tell you the size because they know anatomically how big the vertebrate are and an average size and would say I know how that it is and it basically takes up the space of three of those so this is probably about five centimetres and that is a fairly big, I mean that particular condition is pretty life threatening

DD It looks quite serious, it suggest to me that that could at any moment just pop like

J It does and that is exactly and it is a bit like a balloon the more you inflate it the thinner the walls get so there is the more change it has of popping

DD So it this due to calcification of the

J Exactly and so the calcification causes the blood to wear away the enothelic layer the cells that are a bit like Teflon they keep the non stick and once that non stick ability goes you then end up getting this sort of bulging and if you don't end up, I mean if it bursts you are pretty much, unless they can get you to Ninewells in four of five minutes and that is unlikely because it is the main artery that feeds you heart so if you heart pumps and you have basically pumped half the system

DD I think that is where we should stop, particularly this discussion (laughs)

J I will move onto blood flow because that is a bit more palatable and is not so. This image that you can see straight ahead here is basically a pumping heart it is a real time scan as it moves, it is a cross sectional slice through

the heart and this is in real time

DD So it is only one plane?

J Exactly

DD The motion that happens at that plane

J Exactly and what is interesting about this though it has a degree of interpretation because what is has got it is taken over several heart beats the machine can't keep up with the human heart it can't collect information as quick as the heart moves, so what it does is it takes time lapsed almost imagery and then it pieces them all together to create what you think is a real time image but what is actually essence is not real

DD So this is actually composite of several heart beats

J Exactly, and this image here this sequence here is different in many ways as it is kind of triangulation it is a mixture of lots of different pieces of data to tell the story, the tube is built from the aorta from the two kidneys and the little divot that we saw earlier, the aorta from that scan, the blood flow, the red blood cells are informed just by eye balling that and working with the medical team, they are not translated from anything they are purely interpreted and they are exaggerated as well to tell the story of how blood pushes and then pauses so I'm trying to get the essence of what is happening rather than the translation and obviously the red blood cells are not that size they are a lot smaller than that and it is a stylisation they don't look like Smarties either but what is its doing it is telling a story in some ways so it differs from all the other bits of information because it is almost a stylisation of lots of pieces, it is a hybrid of bits and pieces so the question I suppose I wanted to ask you and we only have got one more image after this to show you and we can have a seat at the end is obviously you feel that affects its integrity because it is a mixture of different things and some of the visual qualities that each one of these images have got?

DD The integrity, yes I think it is kind of fairly obvious that is not what is going on inside of my body so there is an immediate mismatch of realism if you like but then as soon as you realise that as humans because we have this faculty of imagination there is no problem, we just say, okay, this is leap in your imagination and it is demonstrates, illustrates very beautifully and very clearly what the principal that you are tying to get across so the integrity in if you like realist scientific reductionist terms is low because if you came to me and say well I've got two pictures one of them tells you, gives you an actual snap short of your heart which one do you think it is, then obviously I would choose that so in that respect is it very clear but I don't know if that is what you really mean by the word integrity or whether you are looking for something else there

J No I mean I think you have pretty much got a grasp of what I'm trying to get and this notion of integrity and authenticity, I mean what is interesting is that the medics feel that the feedback that I've been getting from them is on a similar lines to what they are saying that this doesn't really have much integrity either because it doesn't tell the full story there is a perception okay that is has the grammar of scientific imagery and it has what we would perceive as an integrity as a layman and think okay it is black and white and

I can recognise that and it looks scientific and okay it must be real

DD *It is done with a machine and it must be real, machines don't lie*

J *Exactly*

DD *But as you have already pointed out this is composite of the number of cycles*

J *And even from a scientific point of view even bringing n surgeons and so forth they are still, they like it and they can see its value in some ways but also it doesn't have any ??/ in it, it only tells on part of the that part of the heart and shows how it interfaces with any other part of the system and it is almost like again a reductionist image and it is very true and its truest sense it is reducing things down to the smallest possible, lowest common denominator is not the right word and I'm not trying to big up this either because this doesn't have any diagnostic value so this authenticity of this is low in respect of you can't make a diagnosis but it maybe has an integrity that gives insight that is more that the sum of its parts, it certainly would say this has no, over and above its functional value there is no other value in some ways but this one I don't know what is communicates, what was really interesting and what I never really noticed or intended to do was someone told me yesterday was it that one of the clinicians spotted something that he thought was quite interesting and was happening as a bi-product which really happens in the body which they can't really see, even from looking at the real data but it has happened in this because it is simulation, it is an animation, it is a representation as the blood moves down once it cuts to the bifurcation which is the split you get like almost like a clotting or a clumping of blood, see in the middle there you see the clumping and that is what causes the anuerism and he said you have shown that and you probably didn't mean to show that but you have built it so it is kind a realistic way*

DD *it is because there is a friction, more friction there that is where the calcification starts*

J *Exactly and all the cells, and it is almost basic fluid dynamics so there is this kind of whole notion that we see it for patients but in some ways does have a context again moving it back into the science so you just get confused by the end of it, well where does this sit and maybe it is not for the artist to place it anywhere it is maybe just for everyone else to place it*

DD *One of the interesting things when doing this is what it makes be self reflect is why do I give it more credits, why do I value that in some way as more objective information like that and that is because we are in a way socialised into giving science and that way of representation more legitimacy*

J *I think you have actually hit the nail on the head and part of the reason to do this experiment is partly that it is almost to tease out that kind of, even amongst artists, you do get that reaction that somewhere we are second class citizens we are producing work that has a lesser integrity although I would argue is different it is should be evaluated by a different set of values. On that that is a really good place to stop and have a discussion as I realise we are fastly running out of time. I mean I will give you a brief summary of what is here rather that go through it all because I think you are probably aware of a lot of this because you know my work and we have talked about*

some of the work and the work in influenced by kind of traditional, there is a degree of traditional interpretation informs the work as I need to know where the bits are and there is almost like a historical premise where building visualisations in the body is nothing new I mean I may be using new contemporary media to do it but it has been done, but in some ways historically I think what I'm interested in more contemporary work really, this is Versallis' who was one of the first pioneers of anatomy books and observation but if you look at the ?? of that model and the grotto in the background the additional almost ornate and elaborate and all this information that shouldn't really be there in our world and it has been added and it almost brings a weight to the image that is often you look at stuff like this is often so utilitarian and often bland, the artist is definitely a celebrated sciences if is definitely a

DD *I wonder what they would make of those in a hospital*

J *I must find out more about this, I mean he was Italian and this was at the time of the I think just after De Vinci but this was published in ?? the churches public because the church had all the printing presses and I think this was 1542's when was the reformation? So some of these images are fascinating and this relationship between the artists and the ?? and some of it is fairly gothic and morbid and body snatchers and some of it is really interesting so there is a historical premise to the work from is a kind of starting point and I thin for us to say people working with ?? and breaking new ground and doing new things were actually not they were actually fairly naïve and fairly, but maybe we have been forced into a corner and we are living in such a reductionist time that we are reducing our work down into so much lowest common denominator almost, this is quite interesting as a lot of this stuff I think has a sci fi look to it and that vocabulary that exists from scientific imagery, space exploration and obviously things like this as well is quite interesting this replication of the natural world a lot of the structures that we see round about us in the natural world and linked inherently to the way our structures in our body are from we are not a million miles away from tree across the road or the Mississippi delta or whatever these satellite images are rally quite telling, so maybe if I can ask you these last few questions as I think we are running out of time, the first question I would ask you is based on what you have seen today what would you define as visual integrity in your own practice as a designer and someone who works in 3D also, what would you define in things that you produce and out put how would you define visual integrity?*

DD *I think for me visual integrity in what I have done in my interior design and furniture stuff it is to do with communicating the right thing so people are not misled, it is clear where you do something in a building, it is clear where you go to and what have a transaction or where you are there to just look at something or*

J *So honesty is part*

DD *I suppose so transparency yeh but at the same time you have this superior dimension of engagement if it is just that then it might just be very bland and boring and so there is that sort of tension between those two transparency, clear communication, this is what the object in my case as most of it is three dimensional it is supposed to do and an element of engagement spectacle if you like, theatre, emotion, beauty, whatever you want to cal it and it is a form*

of visual excitement so I think you can look at anything with that kind of a dynamic and what is it telling me purely as an objective piece of information and how am I engaging with it on a deeper emotional intuitive level

J *It is funny how I should hear you use the word beauty in the context of your own work, because often when you talk to artists or designers and stuff some of them kind of hesitate when they use the word beauty to describe what they are producing, somehow it is a loaded term in that, especially when you talk to Fine artists they often, some of them loathe beauty and they don't see it as part of their work*

DD *It is nowadays, it is very loaded and I think there is a whole way of, I suppose whole critical school of art making that is distinctly anti aesthetic and it is about art being a means for critical debate and the production of art itself has become its own critique if you like and that is very far removed from the traditional notion of beauty but I think we are humans although beauty is a subjective*

J *It is open to interpretation*

DD *Yeh I think there certainly there is a cultural element to beauty and there is a subjective element and what you find beautiful I might not*

J *It is interesting I mean this kind of constant conflict in my own, and I men there is a lot of conflict in my work constantly but there is another conflict that I do create a lot of images that could be regarded as very pretty or very beautiful of using vocabulary which is fairly kind of established the vocabulary of landscape for instance some of the images are composed in a certain structural way to really give a feeling of harmony and the golden section, the rule of thirds some of them are cinematic the images because I made them that way it is not accidental and it is almost like reverting back to what you said I think before do you make something look beautiful that could be seen as very destructive and also secondly making something beautiful does it make you seem naïve as an artist that you are making it beautiful when you like say there is a camp particularly I would say more in the fine arts than maybe in design anyway that feel that that is seen as a lesser art is it not part of high art it is part of a lower kind class citizen because somehow you found beauty and we are passed beauty now, we are out the other side and life is so bad and you know what I'm trying to say*

DD *I know what you mean and I don't think I fully support that I think there is a place for all these things but ultimately for me it comes back to what does it mean to be human and I think being human there is an element there of appreciation for the natural world, for this incredible faculty that we have as human beings of imagination and yeh okay a lot narrative art I'm not very interested in, but some of it I think is extremely beautiful and a lot of highly intellectualised sort of neo materialist, nealist art is not particularly it doesn't appeal to the senses but it has an intellectual beauty because it can be very interesting to engage with that sense of irony or that conceptual approach*

J *But it has to come along with that additional baggage and along with the artefact the artefact has to be heavily loaded, often the artefact is presented with a barrage of intellectual debate along with it to support it and prop it up, often if these things can't stand alone almost they are not independent artefacts by an stretch, although here is my stuff but I would like to think*

some of it might be independent and it might have a life of its own it might just go out there and disappear into the earth and do what it wants but I think a lot of this stuff is often and I'm not criticising and I'm not taking a stance either way I'm just sort of trying to pin point where my stuff sits but it does need a lot of body of transparency, like you described intellect and evidence to sort of give you tools to access it

DD Absolutely

J That brings me on to the sort of last couple of questions one is what role do you feel the artist should play when working with this type of medical scan data, do you think that based on what you have seen and what you know about my work and how I operate do you think my role is a translator, a mediator or an illustrator and these are all loaded terms, so maybe we shouldn't unpack all of them but do you feel you could summarise or even articulate in any way what you feel my role should be?

DD I wouldn't dare, I wouldn't want to in any way dictate that I think what is really interesting about it is that you go into something like this and it is like a journey that is slightly unknown, you think you are doing one thing but you end up at the other end of it with something that has taken you somewhere where you could have never imagined maybe going and so I think what is interesting about it is that you can be all of those things and I wouldn't put a limit on it so I think if you can make money with this one way then do it but keep all the other doors open as well if you can utilise it in a different way and turn it into art or turn it into illustration or do that and try and keep this, look in your own integrity and see what you want to do with it and where you want to take it

J It is almost like I'm jumping between disciplines, I'm sort of moving in and out seamlessly now whereas before I wasn't I was like going from A to B, A and B and A to be and C and they were very kind of discreet packages tot he work, at Ninewells I was an illustrator, in the art college, well they weren't quite sure where to place me but they saw me as a sort of illustrator as well or a kind of visualiser and now I'm sort of moving to a third place, that is a real cliché but I'm moving to this third place that in fact is in both places simultaneously and you are just kind of flicking between the two so rapidly that you lose track of what you are and you are neither an artists of a, I mean I'm definitely not a medic I can't cure people I can't make a diagnosis but I am know equipped with sufficient knowledge now to read these scans and to build imagery and to gain insight and I have got a really good anatomical knowledge and I can seamlessly go into radiology and speak to the doctor and move in amongst the patients as much as I can come down in the studio and build new work in the art college and spend time with the students so it is like almost like this of all my defining roles it is right it is almost like I need to invent a word to describe now what I'm doing I mean

DD Or even is you had to put down visualiser then you probably are closest ton an illustrator in what you are doing but there is absolutely no reason why you can't turn that illustration into fine art, I think you can make that leap very easily if you want to, maybe you don't want to, what is the time John

J That is now quarter past five

DD I have to go

J That was the last question, thanks for your time

DD Well I hope it is helpful

J Definitely, I mean you got the sort of elevator version of it so that was good.